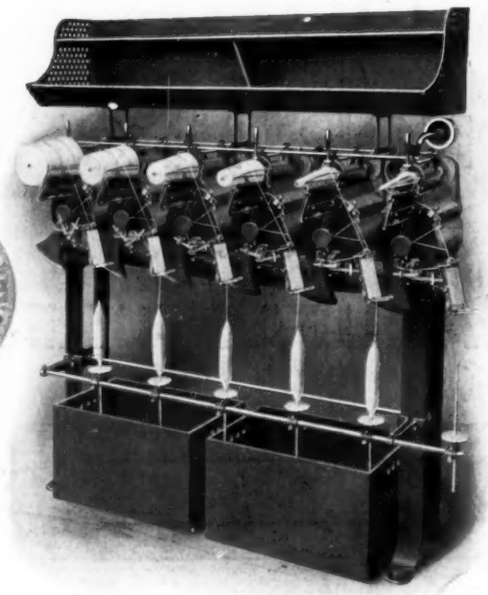
COTTON

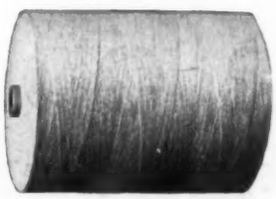
AUGUST, 1913

USE "NUTAPER CONES"



NO. 50 UNIVERSAL CONER

Parts to convert this machine for parallel tubes of various lengths, 1, 2 or 3 ends up, carried in stock and interchangeable.



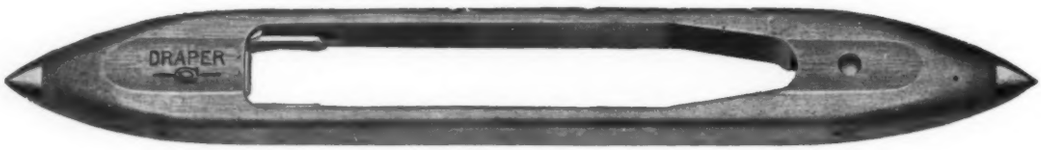
UNIVERSAL WINDING CO.

W. P. Hazlewood **BOSTON** Southern Agt., ATLANTA

Alphabetical and Classified Index to Advertisements Following Reading Pages

THE BEST NORTHROP LOOM

BOBBINS
AND
SHUTTLES
ARE MADE BY
NORTHROP
LOOM
MANUFACTURERS



LOOK FOR OUR NAME
ON YOUR

Shuttles and Bobbins

DRAPER COMPANY

HOPEDALE, MASS.

J. D. CLOUDMAN, SOUTHERN AGENT

40 South Forsyth Street ATLANTA, GA.

NORTHROP LOOM REPAIRS

With our Southern Supply Department in Atlanta, Georgia, carrying a stock of about **300 to 400 tons** of **finished loom repairs,** and with a **still larger stock** in our works **at Hopedale**, we are prepared to give prompt service.

Customers who purchase such supplies of us avoid the troubles incident to misfits, hard castings and bad results in the weaving.

DRAPER COMPANY

HOPEDALE, MASS.

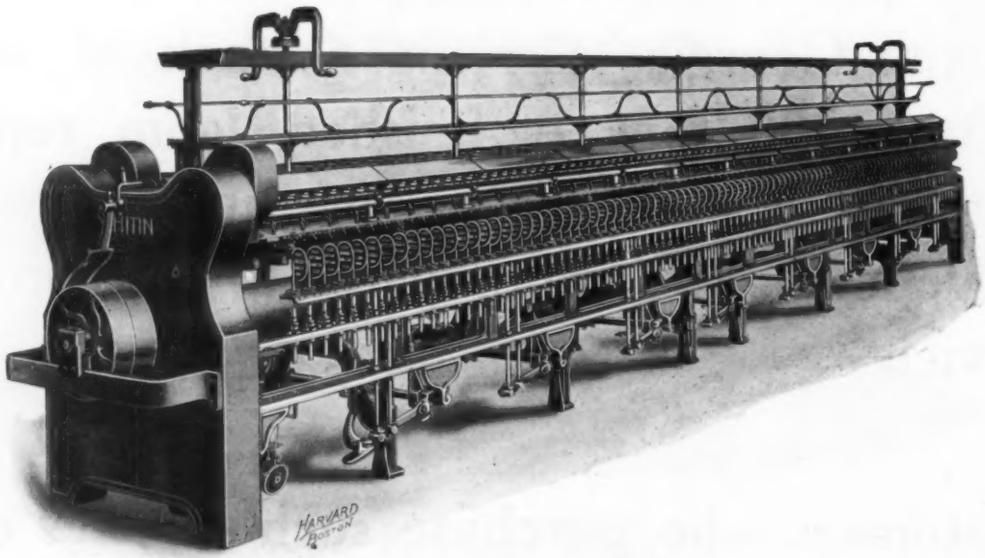
J. D. CLOUDMAN, SOUTHERN AGENT
40 SOUTH FORSYTH STREET, ATLANTA, GEORGIA

The Whitin Machine Works

Whiitnsville, Mass.

BUILDERS OF

COTTON MILL MACHINERY



Ring Spinning Frame

Manufacturers of Carding, Spinning and Weaving Machinery for Cotton Mills.

Southern Agent—STUART W. CRAMER,

Charlotte, N. C.

MASON MACHINE WORKS

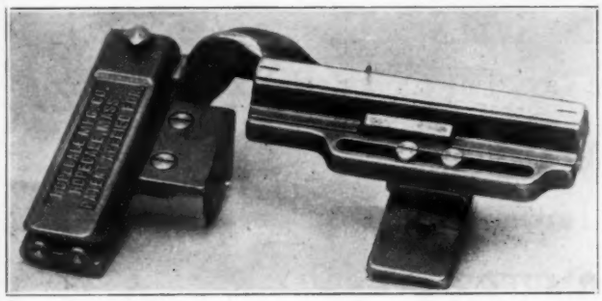
SUPERIOR

LOOM CRANKS

FOR REPAIRS OF
LOOMS OF OTHER
SHOPS

CARDS DRAWING SPINNING LOOMS MULES

TAUNTON MASS. CHARLOTTE N. C.



The only temple giving absolute rigidity of cloth holding pod. Adjustment provided for, insuring this important feature in long, continued service.

TEMPLE ROLLS made from seasoned dogwood, durable and tenacious, holding the specially pointed pins securely. Pins hardened and tempered uniformly, and have a shape and fineness of point that gives the best results with the cloth.

Also **COMPLETE WARP STOP MOTIONS** and **DROP WIRES.**

Write us for details

Hopedale Manufacturing Co.

HOPEDALE, MASS.

THE MOST ECONOMICAL SHUTTLE IS THE
SHABOW SHUTTLES

Our Patent Hand Threading Shuttle containing Shambow-Marble Spindle which we consider the finest spindle made. It stays level longest and is easiest on your bobbins. We have a special Marble Spindle Catch for ringed Bobbins.

We buy the best growths of Dogwood and Persimmon, which come from North Carolina, and which are thoroughly seasoned by the most approved methods. The wood is fashioned into rugged shuttles by the most skilful craftsmen in the shuttle trade.

A Worth While Hand Threader

in the Best Shuttle Made.

SHAMBOW SHUTTLE COMPANY
WOONSOCKET, R. I.
PATENT HAND THREADING SHUTTLES

In A Union of Specialists There Is Strength

PICKERS AND REVOLVING FLAT CARDS
Potter & Johnston Machine Co., Pawtucket, R. I.

DRAWING AND ROVING FRAMES
Woonsocket Machine & Press Co., Woonsocket, R. I.

SPINNING AND TWISTING FRAMES
Fales & Jenks Machine Co., Pawtucket, R. I.

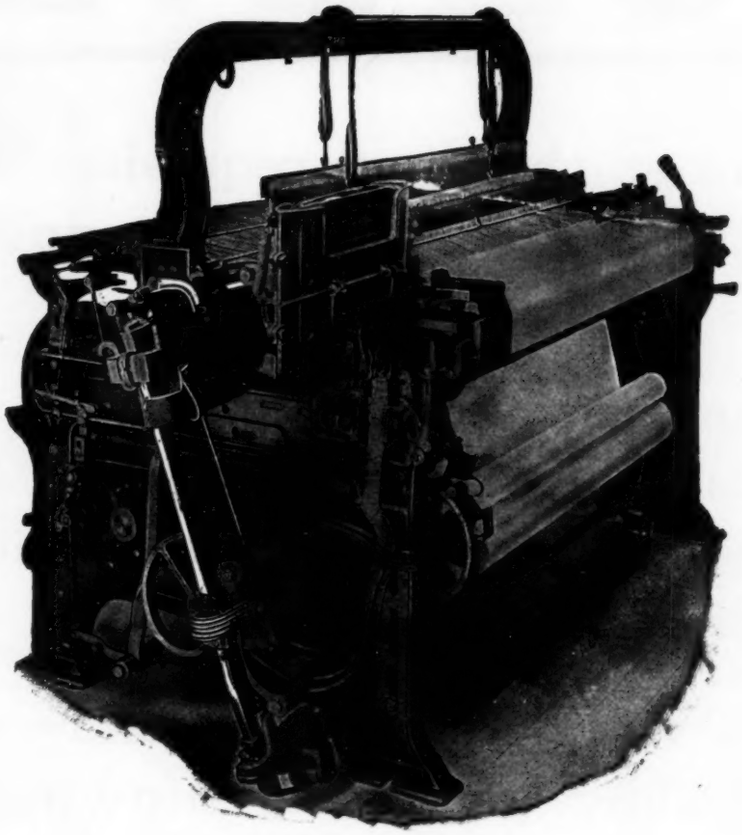
SPOOLERS AND REELS
Easton & Burnham Machine Co., Pawtucket, R. I.

BEAMERS AND WARPERS
T. C. Entwistle Co., Lowell, Mass.

NASMITH COMBERS
John Hetherington & Sons, Manchester, England

J. H. MAYES, Southern Representative
1112 Independence Building, Charlotte, North Carolina
Wm. V. THRELFALL, Northern Representative
Marshall Building, Boston, Massachusetts

"IDEAL" AUTOMATIC LOOM



No other loom can equal it in production, quality of cloth, freedom from breakages and repairs and ability to us cope or bobbin filling.

THE STAFFORD COMPANY

READVILLE, MASS.

FRED H. WHITE, Southern Agent, CHARLOTTE, N. C.

DOBBIES

One of the first requisites in the make up of a good loom weaving fancy fabrics is a good Dobby.

The Crompton & Knowles Loom Works build a complete line of Dobbies accepted everywhere as the standard of excellence.

We will be pleased to send you our new Dobby Catalogue, showing some of the types we make.

Looms for Every Known Fabric

Crompton & Knowles Loom Works

WORCESTER, MASS.

PROVIDENCE, R. I. PHILADELPHIA, PA.

WHITIN RINGS.

LIGHTEST RUNNING
MOST DURABLE, and
MOST ECONOMICAL.

Have you seen our
1910 Diamond Finish

WHITINSVILLE SPINNING RING CO. Whitinsville, Mass. U.S.A.

Manufacturers Should Look Up the Advantages of the

METALLIC DRAWING ROLL

Over the leather system before placing orders for new machinery, or if contemplating an increase in production, have them applied to their old machinery.

25 TO 33 PER CENT. MORE PRODUCTION GUARANTEED

SAVES

Roll Covering *Floor Space* *Waste and*
Varnishing *Power* *Wear*

ONE-THIRD LESS WEIGHT REQUIRED

RUNS SUCCESSFULLY ON

Sliver Laps *Comber Draw Boxes* *Drawing Frames* *Slubbers and*
Ribbon Laps *Railway Heads* *Mechanical or* *Intermediate*
Elec. Stop Motion *Roving Frames*

WRITE FOR POINTS CLAIMED, ALSO PRICES AND PARTICULARS, TO

The Metallic Drawing Roll Company

INDIAN ORCHARD, - - - - - - MASSACHUSETTS

A Lace and Edging Machine That Runs Quietly at High Speed

Also adapted to manufacture of fancy knit goods, coats, sweaters, shawls, nubias, golf vests and their trimmings.

GEORGE W. LINDLEY

5122 Wakefield Street - - - - - - - - - Germantown, Philadelphia

MANUFACTURER OF TEXTILE AND SPECIAL MACHINERY

KILBURN, LINCOLN & CO.

Makers of Looms for

Plain and Fancy Weaving

Fall River, Massachusetts

Southern Agent, O. A. Robbins, - - Charlotte, N. C.

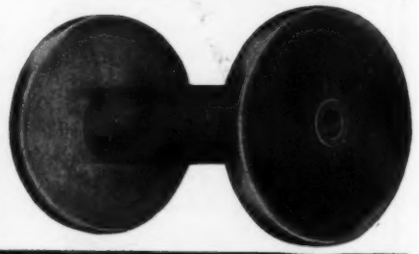
STEWART & SONS

MANUFACTURERS

LOOM REEDS

Jasper and Orleans Sts. PHILADELPHIA, PA

You say your loss from broken spools is but a mere trifle



Did you ever attempt to prove that statement? Do it, for your own satisfaction. The magnitude of this waste is not readily apparent in the stress of other matters, but if you will apply yourself to the matter you'll see it is a big item on the wrong side of your ledger. Our METAL PROTECTED SPOOLS will save practically all this loss for you. They rarely ever break or separate. When you consider that it's the full spool which breaks, you'll see why our METAL PROTECTED Spools save you big money. The metal does not rust or stain the yarn. It protects both the outside and inside of spool. We are making a special trial offer to mills who have never used our spool. Write for this offer and sample spools at once. ADDRESS ☞

LESTERSHIRE SPOOL AND MANUFACTURING CO.

LESTERSHIRE, NEW YORK

Reels for Cotton

WOOLENS AND WORSTED

Patented Hosiery Winders, Cop Winders and Spoolers

Lindsay, Hyde & Co.,

2124 to 2130 E. York Street

Phifadelphia, Pennsylvania

MARCUS A. DARY, Agent and Treasurer. FRED. H. DARY, Superintendent.

Dary Ring Traveler Co.

MANUFACTURERS OF

HIGH GRADE

Spinning and Twisting Travelers

Taunton, Massachusetts

THIS IS TO KEEP YOU INFORMED OF OUR ADDRESS

Our Baskets need no advertising: Their superiority is known to all. They last for years after our address has been forgotten.

All sizes and shapes. For all purposes.

Our registered Trade Mark distinguishes from imitations.

Patented and Manufactured by

MORRIS & COMPANY,

Groveville, N. J.

A. G. THURSTON & SON

R. W. THURSTON, Proprietor

MANUFACTURERS OF

Fluted Rolls, Pressers for Flyers and General Machinery

Specialties made of Reseeking, Refluting, Filing and Honing of all kinds of Rolls

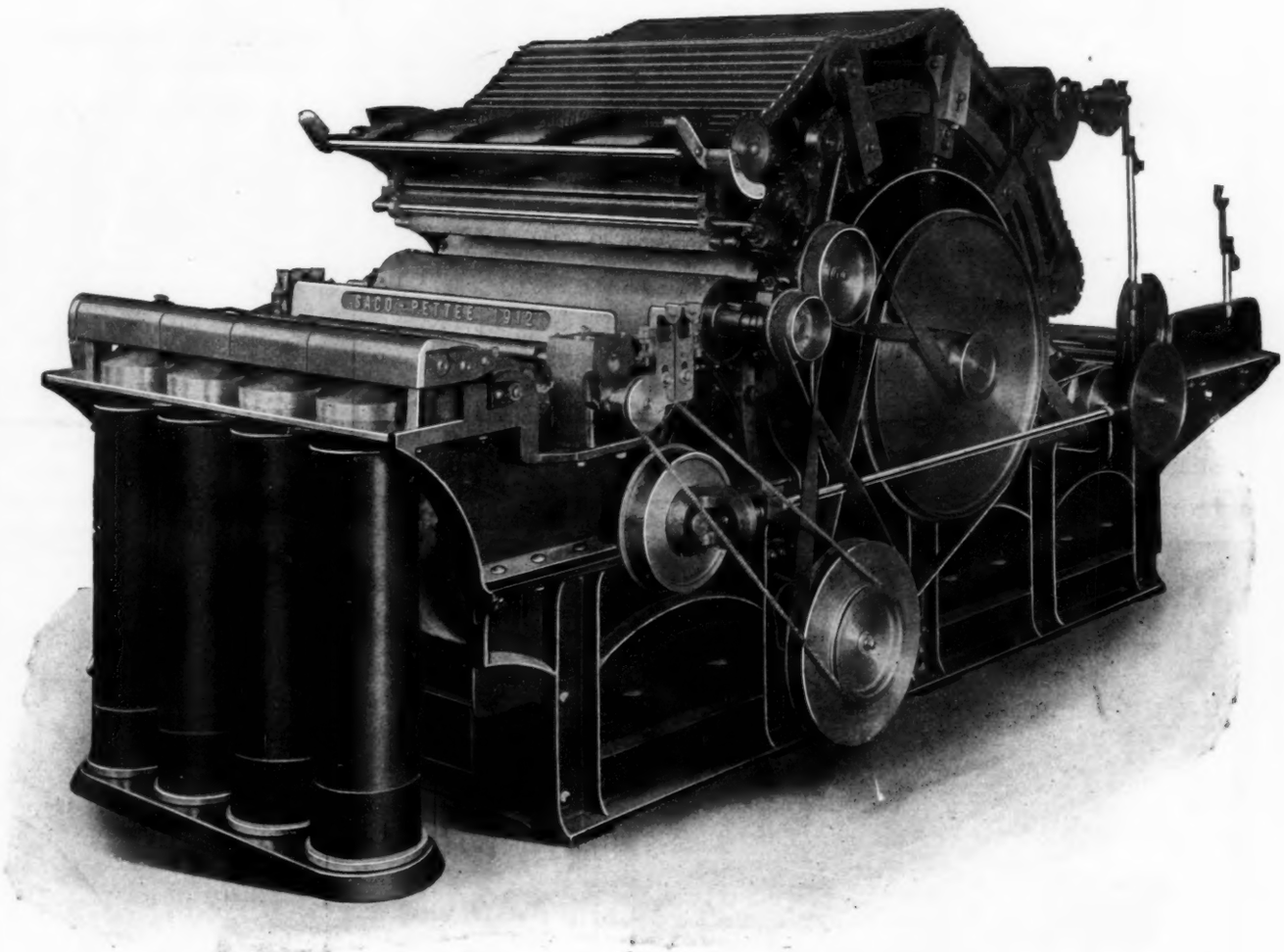
Speeder Flyers repaired and fitted with any style presser.

Spindles Straightened, Restepped and Retopped.

Cor. Mulberry and Division Sts., Fall River, Mass.

SACO-LOWELL SHOPS

COMPLETE TEXTILE EQUIPMENTS

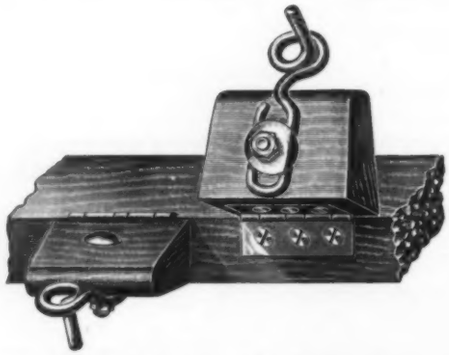


4-COILER WASTE CARD

COMPLETE WASTE REWORKING PLANTS

ROGERS W. DAVIS Southern Agent CHARLOTTE, N. C.

The Palmer Adjustable Thread Guide



For Ring Spinning and Twisting Frames

Easily adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - Connecticut.

A New System of Machinery For Producing Seamless Hosiery

Scott & Williams Model B

INCORPORATED

Replacing Former Model B

Five Yarn Changes.

Sectional slackening prior to the heavy yarn changes, thereby preventing cutting and waste.

Fabric also slackened where high splicing yarn is inserted. thus insuring narrow ankle and foot.

Scott & Williams

INCORPORATED

Model F

The most comprehensive machine ever offered to the trade.

Makes women's hose with integral welt—no sewing necessary.

Or will make women's hose with selvage top. using any kind of yarn from silk to carded cotton.

Makes half-hose without a transfer.

All dropped from the machine—looping alone required.

Anti-run-back course preventing ravelling from garter tears and other causes.

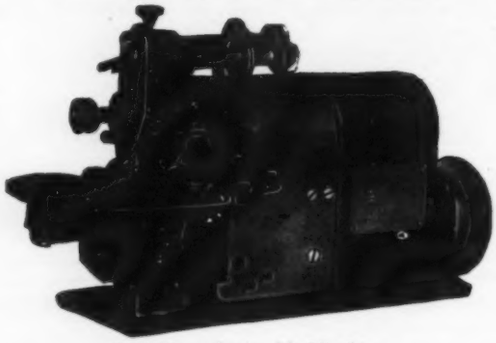
This machine may also be used for making string work, or half hose transferred in the old fashioned way.

Scott & Williams, Inc., 88 Pearl St., Boston, Mass.

Philadelphia Utica

THE MERROW

High Speed Overseaming, Overedging and Scallop Stitch Machines



Our New Style 60 Machine

For Trimming and Overseaming in one operation produces the strongest seam with the greatest economy.

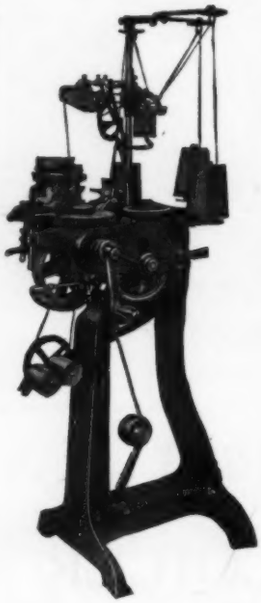
USE STYLE 60S for welting Stockings, blind stitch.
USE STYLE 60H for hemming bottoms of Underwear.
USE STYLE 17 or 22 for Bed Blankets.
STYLE 18 is for Horse Blankets.

SEND FOR SAMPLES AND CATALOGUE

THE MERROW MACHINE CO.

28 Laurel Street, HARTFORD, CONN.

427 Broadway, New York, 237 Market St., Chicago
Knickerbocker Bld'g, 6th and Arch Sts., Philadelphia, Pa.



Quality AND Economy

INVINCIBLE

JENCKES KNITTING MACHINE COMPANY

PAWTUCKET, :: :: RHODE ISLAND

Philadelphia Show Rooms, 1211-1217 Filbert Street

NYE & TREDICK CO.

MANUFACTURERS OF

Circular Rib

Knitting Machinery

FOR

Underwear and Hosiery

Office and Show Rooms
718-720 Cherry St.,
PHILADELPHIA, PA.

Acme Hosiery and Textile Binder No. 30

A simple, inexpensive machine for Attaching Tickets on Hosiery Underwear, etc.

Uses a pointed staple. Cannot injure the finest Silk Hose. Is portable. Can be set aside when not in use. Is operated by foot power and has a patented WORK-HOLDING DEVICE, carrying one dozen or more pairs of Hose, keeping them in perfect alignment and presenting the tops in position to receive the tickets at least twenty-five per cent quicker than by any other method now in use.

For particulars and the address of the nearest agency apply to the manufacturers,

The Acme Staple Co.,

CAMDEN NEW JERSEY

Circular Rib Knitting Machinery

PRODUCTS

Under wear, Sweaters, Cuffs with Cut Welt, Selvage, or French Welt, Mantles, Collarettes, Toques, Golf Caps, Hosiery Tops, Skirts, Borders, Corset Covers, Button Stays, Mittens, Bandages.

FEATURES

Rectangular Slots, Hardened at Bottom, Sectional Caps and Cam Rings, Hardening and Ground surfaces, Sensitive Take-Ups, Two Speed Drive, Dogless Attachment, Positive Pattern Mechanism, Needle Guard and Protector, Automatic Stop Motions, Electric Cloth Cutters.

MANAGER

It is good to make a showing on first cost, but a knitting machine is not like a stock table. The knitting machine manipulates every inch of your yarn making first-class fabric, indifferent fabric or waste. This yarn costs **256 times** as much as the best machine, if the latter lasts fifteen years. Buy cheap stock tables if you must. They can't hurt your goods. But buy only the best knitting machinery.

Wildman Mfg. Co.

Established 1889 **NORRISTOWN, PENN.**

STAFFORD & HOLT

Builders of
CIRCULAR

Rib Knitting Machinery

For Knitting the Latest Style Fabrics.
FOR

Underwear, Sweaters
Toques, Cardigan
Jackets, Borders, Etc.
Also Builders of

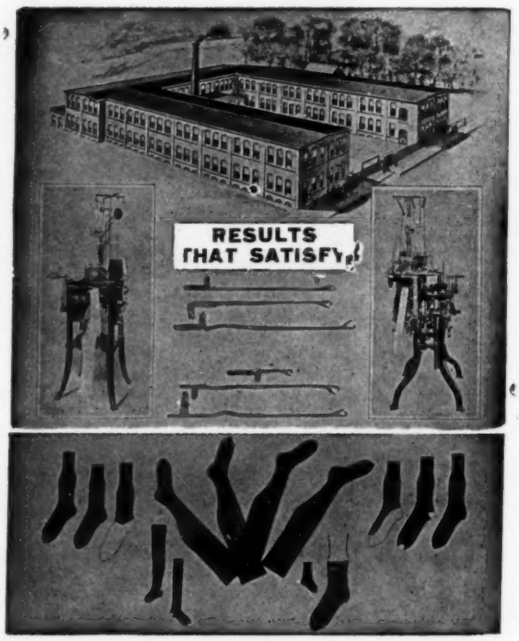
Napping Machines

The Stafford and Holt Pineapple Stitch Machine is the Latest

Write for Descriptive Circular

Little Falls, New York

Quality of Product Secures for Our Customers



ASK THOSE WHO KNOW

Acme Knitting Machine & Needle Co.

Franklin, N. H.

Bourse Bldg., Philadelphia, Pa.

"THE BANNER"

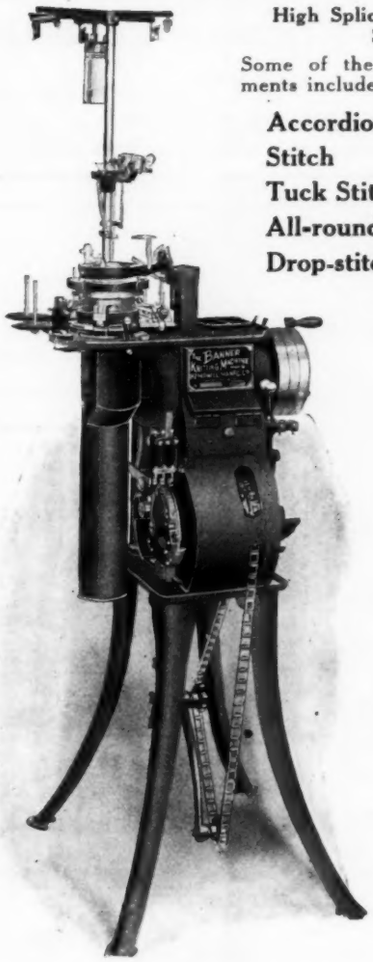
HEMPHILL'S LATEST

FULL AUTOMATIC MACHINE

The FIRST Practical Revolving Cylinder Machine on the Market.

Built for either plain or split foot work, single or double feed. Adapted to manufacture hose with linen or mercerized heel or toe.

Also for Plaited Goods, Silk and String Work



High Splice and Double Sole

Some of the latest improvements include:

Accordion Stitch
Tuck Stitch
All-round
Drop-stitch

These Improvements are fully AUTOMATIC

Largest Production

More Yarn Changes

Highest Speed

Simplest

Least Repairs

PRODUCES A SUPERIOR QUALITY OF WORK

Average Production 100 Machines a Week

Over 2,500 Machines Sold and Delivered from Jan. 1st to July 1st, This Year.

Hemphill Mfg. Co.

131 Clay Street - - - PAWTUCKET, R. I.

IN BUYING BRUSHES

You want to get the best that your money will buy.

That Means Felton's Brushes

Mill brushes of all kinds—High in quality—Low in price.

Send for the book "Felton's Mill Brushes."

S. A. Felton & Son Co.
Manchester, N. H.

CLARK CASTERS

When once tried, are *always* used, because they are far superior in every respect to all others on the market.

Our *Trucks* also are unequaled, for style and durability.

Drop line for Caster Catalog and Truck Bulletins.

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"Pioneer Truck and Caster Mfrs."
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New York Office, 13-21 Park Row

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MAIN OFFICE AND FACTORY
ROCKFORD ILL
BOSTON, MASS. GREENVILLE, S.C.
WARP TYING MACHINES
HAND KNOTTERS FOR SPOOLING AND WINDING

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Specialists in Cost Systems and Manufacturing Accounts.

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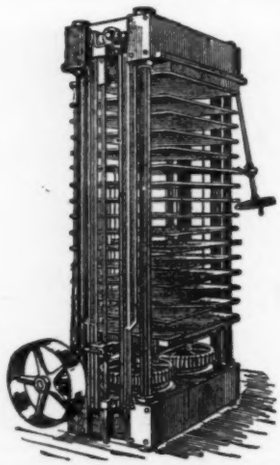
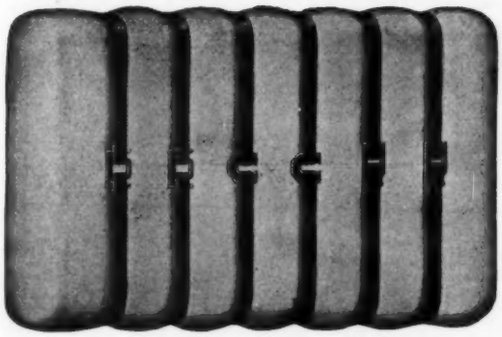
232 Summer Street, Boston, Mass.
Sole Agents in the United States and Canada for Platto Bros. & Co. Cotton Machinery.
COMPLETE MILL EQUIPMENT
Patent Barchaul Machinery for Making Yarn from Cotton Waste, Etc.

This
Knuckle Joint
Baling
Press
IN SIZES
50 to
500 TONS
Send for Catalog

BOOMER & BOSCHERT PRESS CO.
455 W. Water St., Syracuse, N. Y.
A. H. WASHBURN, Charlotte, N. C., Southern Agent



RELIANCE
Hot Plate Screw Press
FOR
Hosiery and Underwear
Write for Catalog and Prices
CHARLES HART,
Reliance Machine Works,
FRANKFORD, PHILA.



Bale Shows Our Three Styles of Buckles.

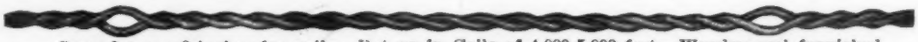
Acme Steel Goods Co.

Main Office and Works
2834-40 Archer Avenue CHICAGO

Eastern Branch, 151 LaFayette St., New York
Southern Branch, 10-12-14 Benjamin St., Atlanta, Ga.

Bale Ties and Buckles
Box Strapping
Corner Irons
Case Seals
Acme Galvanized
Twisted Wire

ACME
ESTABLISHED 1880



Spread every 6 inches for nails. Put up in Coils of 4,000-5,000 feet. Wooden reel furnished.

ELECTRIC SINGEING MACHINERY

FOR COTTON, WORSTED, SILK AND SCHAPPE YARNS AND WIDEGOODS

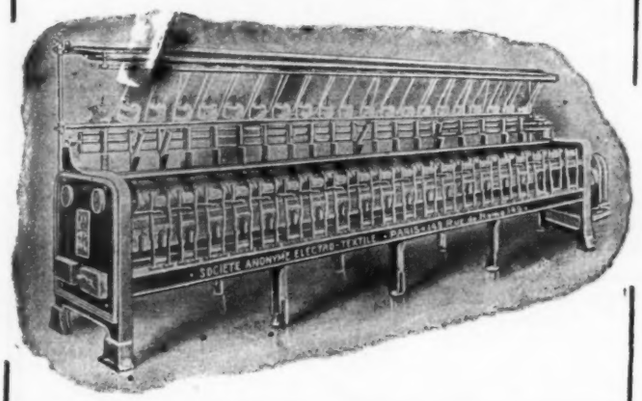
Economy, Quality, Hygiene

We lower your cost of production from 30 to 60 per cent.
We produce yarns of finer quality.
We produce yarns of better color.
We give you absolutely clean yarns and CLEAN SAFE WORK-ROOMS.
Simple to operate.

The only machine that allows manufacturers to meet the demands of increasingly rigid legislation controlling the health conditions of the work-room.

SOCIETE ANONYME ELECTRO-TEXTILE
SOLE AMERICAN REPRESENTATIVE

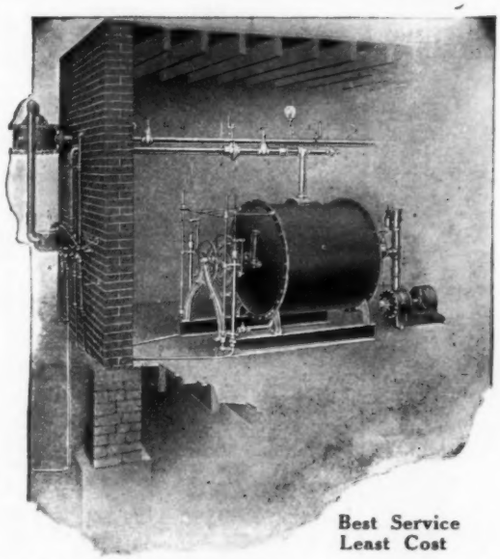
THEO. F. HUSSA, 136 Liberty St., **New York**



YOUR HOSIERY CLOTH AND YARN SINGEING

Can be done at less cost in less time, better and more uniformly by the gas produced by the

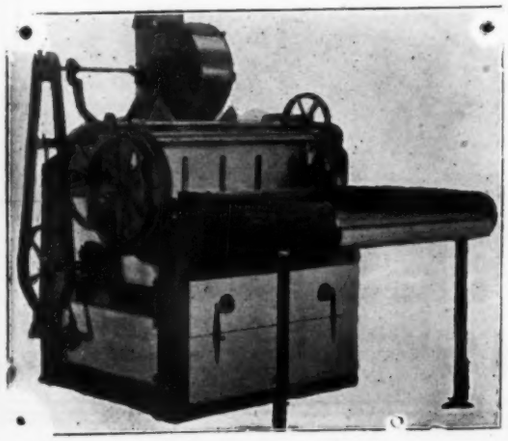
20th Century Gas Machine



Best Service
Least Cost

Clean, blue flame delivered under the pressure or force best suited for the weight and character of the goods you finish. No air mixed at burners. Write for proposition and catalog.

THE C. M. KEMP MFG. CO.
BALTIMORE, MD.



Schofield Patent Automatic Opener and Duster

For opening and dusting Wool, Cotton, Linters, Hair and kindred fibrous substances.

"Schofield" intermediate feeds for Cards, Wool, Rag, Waste, Hair and Lumper Pickers, Automatic, Cone and Oldham Willows, Rag and Extract Dusters, Waste Pullers, Blamaine Lap Feeds, Curled Hair Pickers, etc.

WILLIAM SCHOFIELD CO.

Iron Founders, Textile Machinery Builders,
Krams Ave., Manayunk, *Philadelphia, Pa.*

AUTO TIRES
BARGAINS

AUTO TIRES—BARGAINS

STANDARD MAKES LOWEST PRICES LARGEST STOCK

3500 MILE GUARANTEE

If a tire fails to run 3500 miles we will replace it with another tire for one-half the price marked below

BARGAINS

SIZE	TIRES	TUBES
28x3	$7.25	$2.25
30x3	8.75	2.30
32x3	9.90	2.49
30x3½	10.00	3.12
31x3½	11.00	3.12
32x3½	11.25	3.28
34x3½	11.50	3.50
36x3½	12.20	3.66
30x4	12.25	3.84
31x4	12.75	3.96
32x4	13.00	4.05
33x4	13.75	4.17

BARGAINS

SIZE	TIRES	TUBES
34x4	$15.00	$4.29
35x4	15.00	4.40
36x4	15.25	4.50
40x4	20.00	4.71
42x4	22.00	5.00
34x4½	19.50	4.71
35x4½	20.00	4.71
36x4½	20.50	5.66
37x4½	22.00	7.00
38x4½	25.00	7.20
35x5	21.00	5.66
36x5	23.00	6.66
37x5	24.00	6.66

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On C. O. D. orders we require 20% deposit. We have odd sizes and 1905 Dunlops.

When ordering state what is wanted—Clincher, Q. D. Clincher or Dunlop. FISK Bolted a Specialty. Always in Stock.

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Phone 3194 Columbus **1612** BROADWAY, New York City Cor. 49th St. INC.

AUTO TIRES
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The L. C. Smith & Bros.
Ball-bearing, Long-wearing Typewriter

Every typeface strikes the printing center everytime

How much service can you get from your typewriter?

It's what a machine *does*, not what it *costs*, that is most important.

All typewriters do *not* have the same efficiency and the same operator does *not* get the same result on every writing machine.

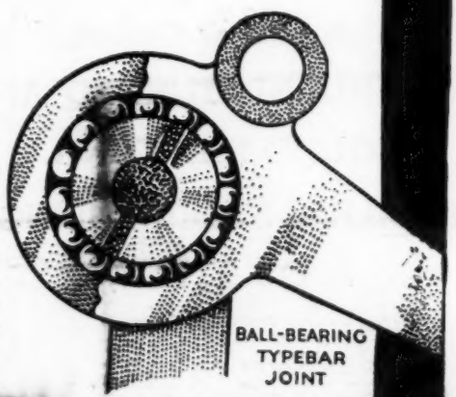
The L. C. Smith & Bros. Typewriter

will produce ten to twenty per cent. more work than any other typewriter ever made.

How is this possible?

Here are a few reasons:

1. It is ball-bearing throughout—others are not.
2. All operations are controlled from the keyboard.
3. It is the lightest touch machine made.
4. It does not "smut" the carbon.
5. The ribbon reverses automatically.
6. The type is so protected that it is not battered by collision.
7. One motion of the hand returns the carriage and operates the line space.
8. It has an inbuilt biller and tabulator.
9. No trouble to write on paper as small as a postage stamp.
10. It is built for service.



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Gentlemen:—I am interested in a Typewriter for ☐ General Correspondence ☐ Label Writing ☐ Billing ☐ Tabulating ☐ Card Writing

Name

Address

To L. C. SMITH & BROS. TYPEWRITER CO.
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Was Awarded GRAND PRIZE at the St. Louis Exposition 1904 for Superior Quality of Goods

HOSE FOR ALL PURPOSES.

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EUREKA	PARAGON	RED CROSS
Four Ply	Three Ply	Two Ply

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These goods are especially adapted for use in Cotton, Oil, Woolen, Silk Print, Knit Goods and Carpet Mill, Pulp and Paper Mills, Sugar Refineries, Ice and Refrigerating Machinery, Chemical Works, Tanneries, Etc.

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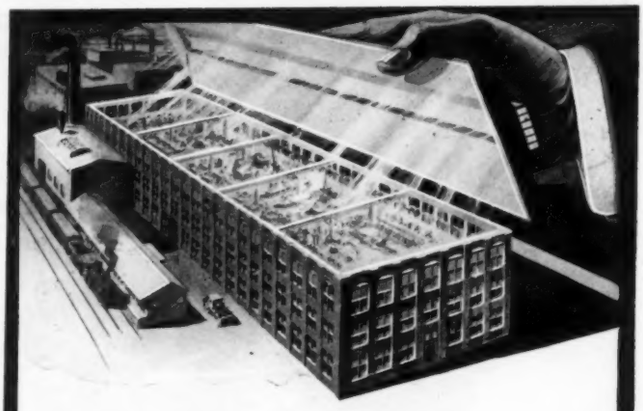
Complete stock for immediate shipment



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RICE'S MILL W HITE

will put sunshine on your ceilings and walls. It will increase your light 19 to 36 per cent.
Rice's Mill White contains no varnish and will not crack or scale; it sheds dust, doesn't soil easily and can be washed like enamel. It is the only OIL paint giving a GLOSSY tile-like surface.

We were the originators of "Mill White" paint. None of its imitations possess the elastic, durable qualities which made the reputation of "Mill White" paint.

Rice's Mill White Paint is sold direct, in barrels containing sufficient paint to cover 20,000 square feet, one coat. If you have that area of ceiling and wall space to cover,

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Ask for a copy of our booklet, "More Light." *Write today.*

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Trade Mark
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"LIGHTS LIKE THE SUN"

Many of the largest mills are using this great preparation in greater and greater quantities. It does not chip off when applied over delicate machinery, can be used in damp rooms because it stays where it's put, and is impervious to moisture.

Write us for the names of textile mills that have used this coating. Ask your dealer for it. If he cannot supply you write us. Drop a postal for Booklet P that tells you all about Bay State Brick and Cement Coating.

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It was used here.

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The Felton Curved Sweep

Saves the broom expense. A push broom **with a curve** that throws the dirt and lint to the center.

Let Us Figure on Your Brushes

"Southern Made Mill Brushes Made Right."

D. D. FELTON BRUSH COMPANY
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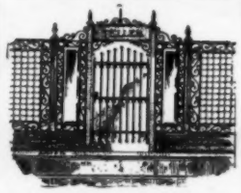

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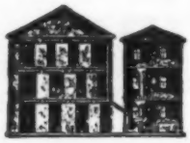

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For the handling of wool and cotton stock, rags, excelsior, jute and all kinds of fibrous material, wet or dry. Also speed elevators, steam heating and ventilating and mill work generally. Blower and fan work a specialty.
This conveyor is patented. Beware of infringement.
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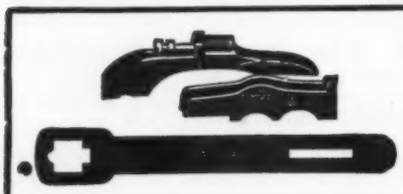

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SOLE MANUFACTURER OF
Dixon Patent Locking and Stirrup Adjusting Saddles and Stirrups
The weight can be taken off and put on to the middle rolls, without stopping your frames, when long stapled cotton is used. The stirrup is always in place. No bent stirrup resting on rolls. Manufacturers of all kinds of saddles, stirrups and levers. Send for samples and prices. Spinners' Supplies in General.

The "Lawrence" Mill Crayon
is clean, gritless, economical, and perfectly safe.
Improved formula and process.
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International Reputation for Practical Instruction, Adequate Mechanical Equipment, Successful Graduates.
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Courses of Study include all Branches of Textile Manufacture.
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Illustrated circular and advice as to suitable courses of study, sent on application to
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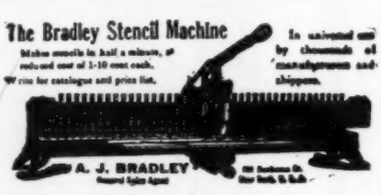
Bradley Stencil Machine



Bradley Ball Stencil Pot uses Liquid Ink for marking and stenciling. Price 30c or $3.00 per doz. Manufacturers of Oil Stencil Papers.

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CARY'S EVERLASTING FLEXIBLE STEEL MAT

Has a Scraping Surface in Every Direction.
Practically Indestructible.

Rust-Proof Reinforced Edges

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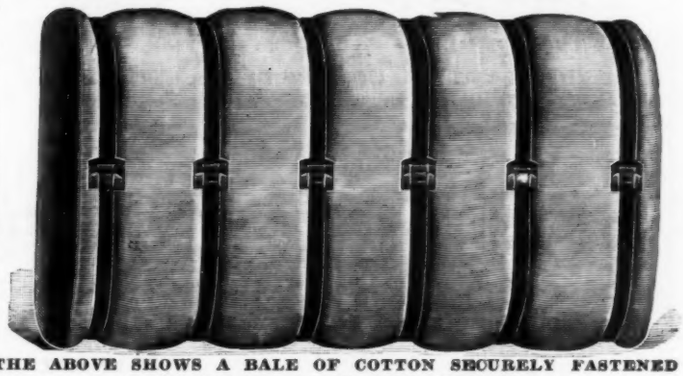
The U. S. Government has contracted for this Mat to be used in all its buildings throughout the U. S.

TWELVE REGULAR STOCK SIZES.
SPECIAL SIZES TO ORDER

CARY'S BALE BAND AND BUCKLES

THOSE WHO HAVE TRIED THEM SAY THEY ARE THE BEST



THE ABOVE SHOWS A BALE OF COTTON SECURELY FASTENED BY OUR BALE TIES AND BUCKLES
NOTE ITS NEAT AND COMPACT APPEARANCE

The Buckle can be applied with the Locking or Hook part next to the Bale, so that there is no possibility of its getting caught in other Bales when piled together.

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TWISTED AND FLAT WIRE BOX STRAPS and a FULL LINE OF SHIPPERS' SPECIALTIES.

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Our new Self-Tightening Twisted Wire Strap. Nails can be driven anywhere.

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Received the Highest Award on recommendation of the Franklin Institute for

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Is the largest manufacturer of Humidifiers in the world. The last twenty years receiving the Highest awards in this country and Europe for its Air-Moistening System. Eight Gold Medals and others.

The Only Perfect System of Air Moistening

And Has Been Adopted by the Representative Manufacturers of this Country.

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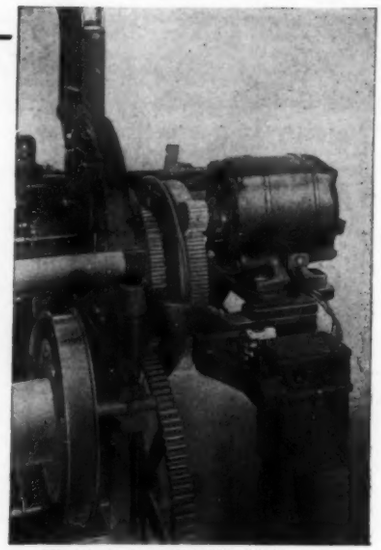
Uniform Speed Means Greater Production

and uniform speed cannot be obtained with belt drive. Belts *will* slip. Repeated tests show this and in mills where the operator thought he was getting constant speed, too.



Westinghouse Textile Motor Driving Loom.

Westinghouse Loom Motors

usually increase production from 5 to 10 per cent. Their speed variation is only a small fraction of one per cent; they can be geared to just that point which gives greatest production. With belt drive the best you can do is to come *somewhere near* this point.

Also bear in mind that motor drive means—no spoilage by oil dripping from overhead shafts,—"seconds" practically eliminated,—fewer warp ends broken,—less breakage of picker sticks,—bills for lubricating oil cut 'way down,—no belt upkeep, and lighter and more sanitary plant.

The Westinghouse Electric and Manufacturing Company stands ready to prove to textile mill operators, and without obligation on their part, the advantage of individual motor drive; and will also recommend the particular motor that will give the most efficient operation and greatest production.

The Westinghouse Electric & Manufacturing Company was the first to apply individual motors to looms.

Westinghouse Electric & Manufacturing Company

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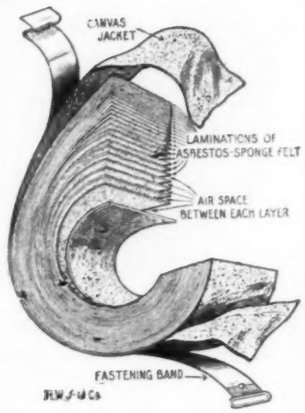
Astonishing Reductions in Fuel Bills

effected by ordinary pipe coverings when placed on bare pipes are not as remarkable as the reductions J-M Asbesto-Sponge Felted Pipe Covering makes in fuel bills when placed on pipes previously insulated with ordinary covering. Repeated tests prove that J-M Asbesto-Sponge Felted Pipe Covering will save about 26 per cent more coal than any ordinary covering. It will carry steam over a mile with practically no loss. The secret lies in the fact that



J-M ASBESTO-SPONGE FELTED Pipe Covering

contains more dead air cells than any other covering.

Vibration or rough usage will not crack, break or cause J-M Asbesto-Sponge Felted Pipe Covering to crumble or lose its insulating efficiency. It retains its superior efficiency indefinitely, because made from many layers of a thin felt composed of best quality Asbestos Fibre and fine particles of granulated sponge.

To use J-M Asbesto-Sponge Felted Covering is an investment, not an expense.

Write our nearest branch for sample and catalog No. 100

H. W. JOHNS-MANVILLE CO.

MANUFACTURERS OF ASBESTOS AND MAGNESIA PRODUCTS — ASBESTOS — ASBESTOS ROOFINGS, PACKINGS, ELECTRICAL SUPPLIES, ETC.

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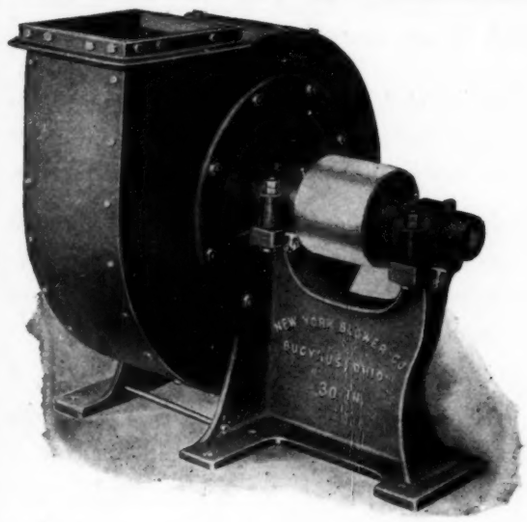
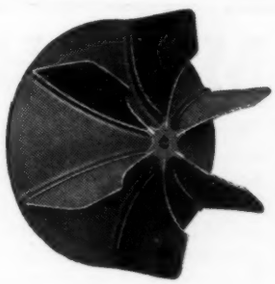


THERE'S QUALITY THERE



OUR PRICE IS FAIR

Our Reversible Fan for cotton mills proves best because it runs without a tremor---the wheel does not clog up as there are no bolts to catch the fibre. Other reasons are made clear in our catalogue.

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Pioneer, Positive, Powerful Perpetual, Popular, Peerless
Removes Heat, Steam, Gases
Cools, Dries, Purifies

Reward of Merit.
Over 9,500 in use.

If you have trouble in your Acid, Dye, Engine or Drying room, we prescribe the Blackman Ventilator as a remedy. Consultation free. Send for highly interesting Catalogue to manufacturers.

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We carry a complete line of REVERE GOODS

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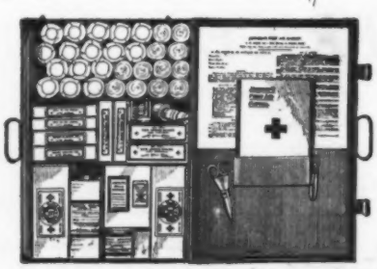
Wherever there is liability of injury to an employe, common humanity requires that first-aid-to-injured material be available. Johnson's First Aid Cabinet not only provides this humane necessity but has proven an economical equipment to thousands of employers and industries.

Johnson's First Aid Cabinet.



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Installed in mines, mills and shops to a greater extent than all others combined.

Sold by the drug trade and mill supply concerns. Illustrated and descriptive literature on request.

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Cocheco Leather Belt Cement

The cement which has been used in making Cocheco Belting for over 70 years, and which we are now offering for general sale.

This is not a cheap preparation prepared for outside sale, but is guaranteed the same as that we use ourselves in making our own Cocheco Belts.

It is made by a formula perfected through 70 years of beltmaking, and belting buyers everywhere know that Cocheco Belting has no superior, if an equal.

We put it up in attractive cans in ½, 1, 2 and 5 lb. sizes, and can make prompt deliveries from stock in our stores in Boston, New York or Chicago.

When cement is needed we suggest a trial of Cocheco Leather Belt Cement.

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All *claims* made for *SPARTAN BELTING* are embodied in the Spartan *guarantee*—the broadest and most liberal guarantee made by any belting manufacturer—it's your protection and guarantee of absolute satisfaction. We not only *claim* that *SPARTAN* will out wear any other belting material (when used under the same conditions) but guarantee it. Don't depend upon mere "claims," when you can have the protection of the *SPARTAN guarantee.*

SPARTAN LEATHER BELTING

Possesses a unique combination of extreme pliability, great tensile strength, high efficiency and wonderful durability, thereby insuring an instantaneous grip, less tension and a material reduction of the friction load. Spartan has proved to be without an equal for successfully meeting all abnormal conditions. *Send for samples, prices and the Spartan Book.*

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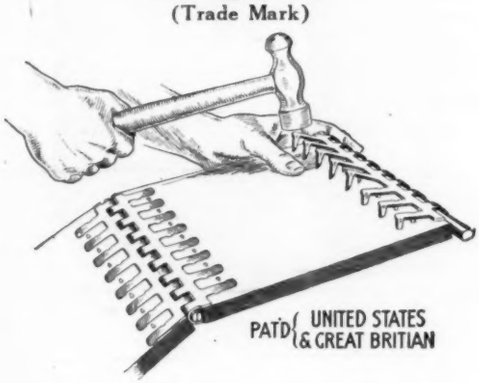
Alligator

(Trade Mark)



Steel Belt Lacing

is applied without special machines or tools. A hammer—3 minutes' time—a perfect joint. And it works equally well on any kind of belting.

"Alligator" makes a hinged separable joint that will stand hard strains. Its use saves time, belts and temper.

Try a sample lacing free. State the width, thickness, and kind of belt used and let the lacing prove our claims.

FLEXIBLE STEEL LACING CO.

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DUST is an Abomination

to the efficient Mill Superintendent, and machinery which will not catch or hold dirt meets his approval.

Allis-Chalmers Textile Motors are all made with well rounded surfaces having no corners to catch lint or depressions to hold dust. The rotating element is particularly free of access and easily cleaned by air.

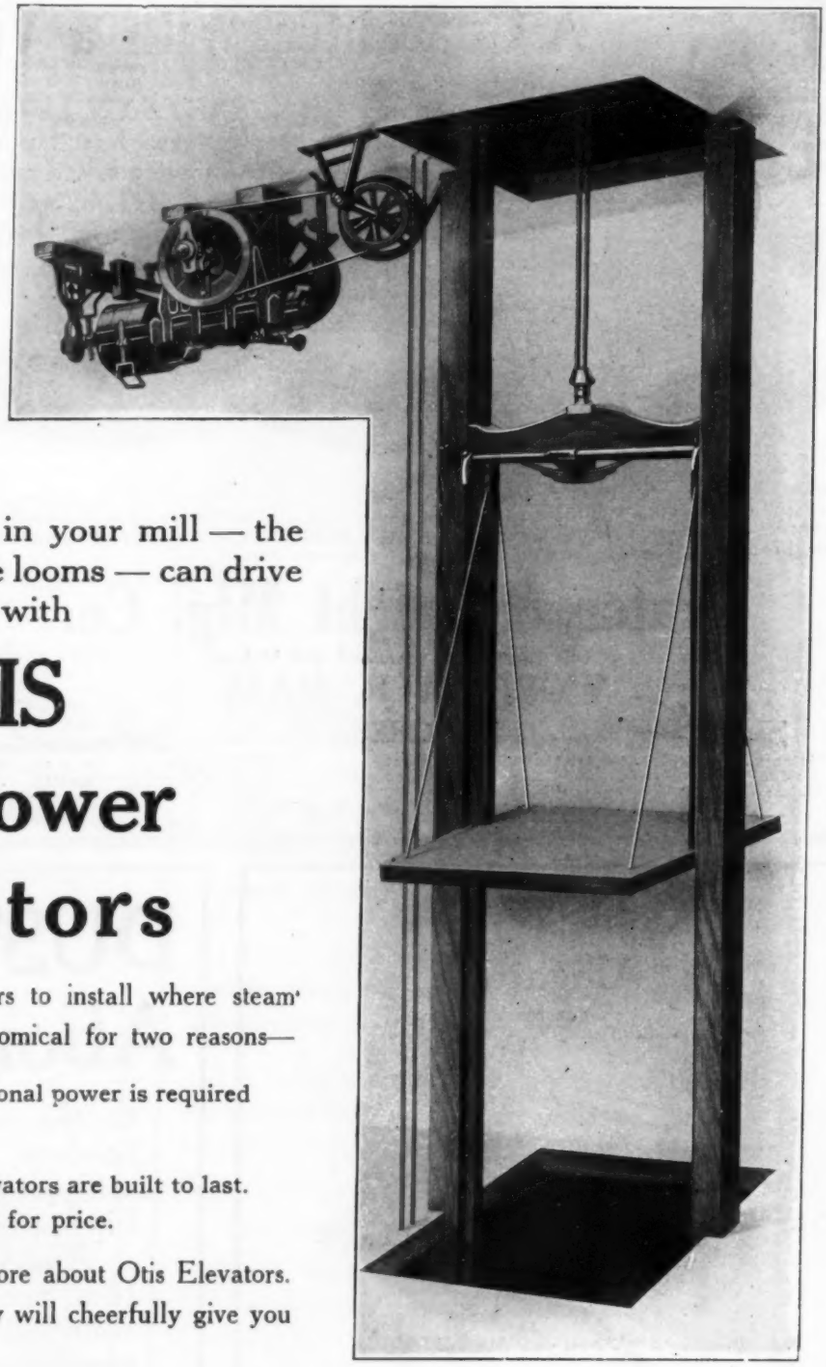
"Motors for all Drives."

Allis-Chalmers Manufacturing Company

Power and Electrical Equipments

Milwaukee - Wisconsin

Let Your Steam Power Perform Double Duty



The steam power in your mill — the power which drives the looms — can drive your Elevators as well with

OTIS Belt-Power Elevators

The most economical Elevators to install where steam power is available—most economical for two reasons—

1—Because no additional power is required to operate them.

2—Because Otis Elevators are built to last. Quality is not sacrificed for price.

It will pay you to know more about Otis Elevators. Any of our Offices listed below will cheerfully give you full information.

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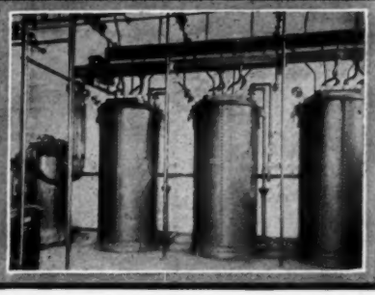
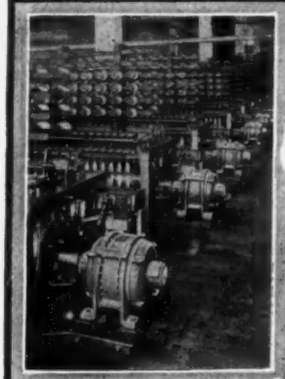
Transformer Room.



Switchboard Room.



Twister Drive.

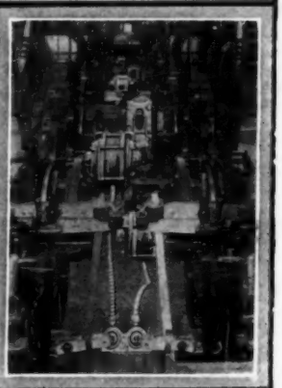
"The Last Word in Textile Mill Construction"

This has been said about the Dunean Mills, Greenville, S. C., which purchased all power equipment from the General Electric Company.

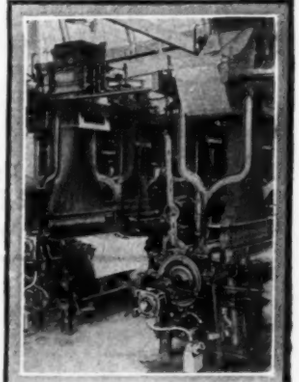
Individual motor driving with G-E textile motors is found in practically all departments. The motors are of a textile type especially designed so as to take care of the varying loads required in textile work. They are dustproof, and have waste-packed bearings as well as taper shafts for the reception of pinions. The Picker and Spinning Frame Motors are equipped with screens and are controlled by oil switches. The Picker Motors are provided with pulleys for belting to pickers and Spinning Frame Motors are provided with steel pinions to mesh with G-E cloth gears on the spinning frames.

Twelve hundred ⅓ hp. 1800 R. P. M. totally enclosed motors are each geared to a loom in the weave shed. Each loom is equipped with a friction clutch and the gear, which forms the friction element of this clutch, meshes with the motor pinion, The loom can be stopped and started as ordinarily, by throwing the lever operating the friction clutch just as is done with a belt driven loom.

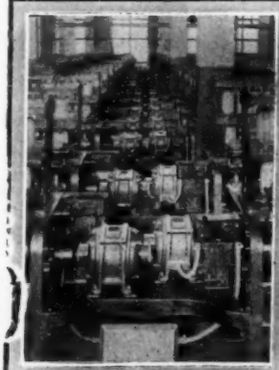
The operation of this equipment has been satisfactory in every way.



Loom Drive.



Jacquard Loom Drive.



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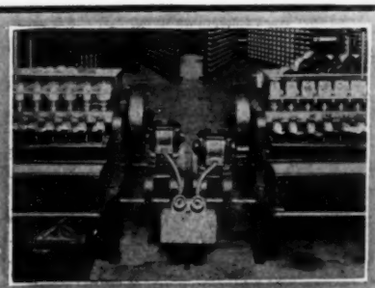
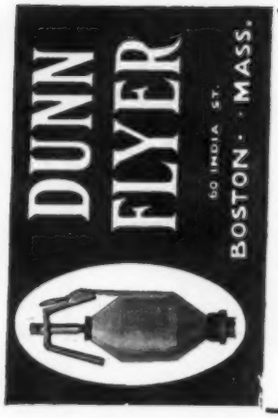
Picker Drive.



Spooler Drive.



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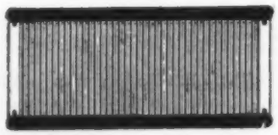
LOOM  **REEDS**

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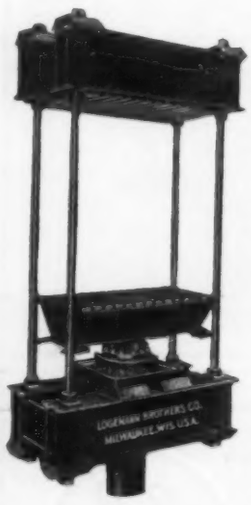

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A VITAL POINT FOR THE MILL MANAGER.

Among the ever present problems of the cotton manufacturer is that of power cost. The busy mill official is beset on the one side by the central station expert with current to sell and on the other side by the advocate of the isolated plant with equipment to dispose of. Being, as a rule, a business man rather than an engineer, there is much information tendered to him that is more or less unintelligible. As the representative of the cotton manufacturer, COTTON takes a broad, unbiased view of this subject, and has presented from time to time papers and articles outlining the position of the isolated plant representative as well as that of the central station man. Where the local conditions at the mill indicate it to be more advantageous for that mill to use central station current, COTTON favors such use; likewise, where the local conditions point toward the isolated plant for the most economical results, COTTON recommends the isolated plant.

There are, however, a number of business points that the manufacturer should consider before he signs his name to a 10-year contract for current, or a cash contract for equipment. He should first of all consider what the term "power cost" includes. If he has an isolated plant, he naturally places under this single heading not only the actual horsepower consumed by the machinery, but also the cost of operating the lighting equipment, the cost of the steam used in heating the mill and operating the slashers, and the mechanical operation and upkeep of the plant. He carefully checks up the figures of his master mechanic or chief engineer and learns therefrom that his total power cost is a certain amount, this amount varying much in accordance with the location of the plant, its size, its equipment and its management.

This total cost, which includes capital charges, taxes, insurance, depreciation, etc., is the guaranteed cost of mechanically operating the mill as finally submitted to the board of directors at the annual meeting. Therefore, if the manufacturer is approached concerning the signing of a "power contract" by a central station representative he should demand a guaranteed total cost which he should then compare with his own actual results and in this manner pave the way to an instant decision as to which method would be better for his own particular case.

Suppose we assume that the final figures show the actual total cost to be $42,000, and that his plant is of 2,000 horsepower, indicated. By dividing the first figure by the second, we find the total cost per unit to be $21 per horsepower per year. Suppose we also assume that this manufacturer has an offer of a ten-year "contract" to furnish him with central station current at the rate of $16 per horsepower year. This saving looms large. But will he get that saving? Let us figure a little on that side of the proposition.

First of all, he should remember that he is not buying *power*, but *current*. This current might be termed power in the raw state, but it must be converted into power suitble for his work by machinery and labor of his own purchasing. Therefore, in this instance, the term "per horsepower year" is merely a nominal one, and any rate based on that nominal term is to a certain extent misleading. It is true that 746 watts of current is equal to one horsepower, but it should be remembered that this one horsepower unit is *electrical*, not *mechanical*, and must be converted before it can be used, thereby reducing its value. As 90 per cent efficiency is probably a fair average for cotton mill motors, we will divide the rate of $16 by the efficiency, which gives us a new rate of $17.77, which is the cost of the current required to develop the horsepower actually utilized.

The current delivered, however, has little bearing on the bill rendered, because under the "special rates" of this contract the "power curve" or current consumption is based on the *peak load* for the month and while the average load might have been only 1,800 horsepower, because on one bad morning the load increased to 2,250 horsepower, the latter amount is charged for. The variation is purposely exaggerated to draw attention to this point.

One of the reasons advanced by the salesman of direct connected motor equipment is the ability on the part of the manufacturer to cut out idle machines, thereby saving much in frictional losses as well as wear and tear. With the contract for current outlined, however, this saving in frictional losses would be made by the central station and in addition they would be paid for the full amount of current or the amount the manufacturer would have used had he operated his plant in full.

So far we have considered only the power consumed by the machinery. Let us now consider the lighting equipment. While this is a comparatively small item, it is well to remember that a different rate is usually charged for this class of service, and that it is current to be delivered, not candlepower.

The cost of heating and slashing must be figured on and the coal, capital charges, labor and supplies to operate a separate plant for a mill of this size would amount to approximately $10,000 per year or $5 per horsepower year, using the nominal amount of 2,000 horsepower as a basis. This amount added to the new rate for current would bring up the price from $17.77 to $22.77. This total cost for heating and slashing might not exceed $8,000 per year, and the actual current paid for might average 2,200 horsepower for the year, which would, of course, change the figures given to $3.64 per horsepower, making a total rate of $21.41 per horsepower year. The higher the "power curve" the less will be the *apparent* total cost per horsepower with this plan, but the balance sheet will tell another story.

One more point to look out for is the minimum charge for maintenance and investment that is usual with such contracts. Should the mill find it necessary to curtail or close down entirely as was the case with many mills in 1911, this minimum charge would continue to call for payment; while if the mill ran only part time the "power curve" with its "peak load" would still be in evidence.

In conclusion, let us again consider that one vital point for the business man and mill manager, namely, do not place too much weight on the rate per horsepower per year as power *per se*, except, when this rate represents the *total cost* of the mechanical operation of the plant, which includes heating, slashing, lighting, etc. This is most important.

GEORGIA COTTON MANUFACTURERS' ASSOCIATION.

The recent amendment to the Tariff Bill placing a tax on contracts for the future delivery of cotton has been strongly criticised in many quarters. In this connection the Cotton Manufacturers' Association of Georgia recently sent the following telegram to the Senate Finance Committee:

"The Cotton Manufacturers' Association of Georgia urges the most careful consideration of your committee as to the effect of the proposed Clarke amendment placing a tax on contracts for future delivery of cotton on the legitimate hedges which the mills of this association buy for future delivery. This transaction is the antithesis of gambling. It protects the mill when actual cotton cannot be obtained to cover the purchase of cloth by a buyer who wants deliveries made months ahead. This purchase of cotton futures is sold when actual cotton is bought, and this transaction is the backbone of the cotton mill business; and, if the cotton exchanges of New York and New Orleans are to be prevented from selling futures to actual producers and consumers of cotton, both the mills and the farmers of the South are bound to suffer. If legislation must be had to stop gambling in cotton or other products for gambling purposes only, then there should be an exemption made in order to protect farmers and manufacturers who use the cotton exchanges in order to keep from gambling. This is a sound business proposition, which your committee cannot ignore or refute, and the earnest consideration of same is respectfully requested by our association of some 140 cotton mills, representing $40,000,000 of invested capital."

GOOD WORK.

Under the rather startling heading, "The Yankee Invasion," *Peru Today* comments editorially on the visit to Lima recently made by members of the Boston Chamber of Commerce who "have invaded these shores and are now passing on to our neighbors in the South. But, instead of blood, fire and violence," the writer continues, "they conquered by genuine good fellowship and understanding.

"Their visit is of exceeding importance to the West Coast, and to all of South America. It is the first group of men, representing a big commercial organization, to make the grand tour. The Caribbean Sea district has seen delegations of commercial clubs, of United States Congressional committees and others, but this is a wider and more ample step by a group of prominent men, to include all of the southern part of the New World.

"The keen analytical insight which has made them successful in their own field has helped them to get a general insight, at least, of local needs and requirements. It has not taken them long to sense the vast natural wealth and resources of this country. The difficulties attendant upon its development will not escape them, but we are confident as to their ultimate verdict concerning the rosy future of Peru and the West Coast generally, lying as it does along the great Highway of Commerce and the New Trade Route."

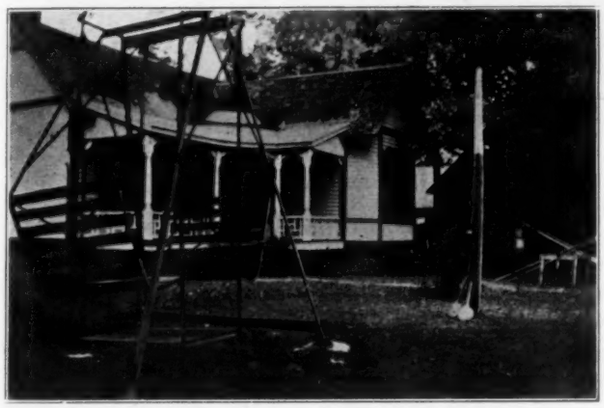
THE Y. W. C. A. AT ALABAMA CITY

A Branch of Welfare Work That Is Attracting an Unusual Amount of Attention Among Thoughtful Cotton Mill Managers. Some other Work of a Similar Nature That Was Promoted by the Late C. H. Moody.

It is often said that "the good a man does lives after him," and perhaps at no time in recent years has this adage been better exemplified than it is in the case of the late C. H. Moody, for many years the active head of the Alabama Mills of the Dwight Manufacturing Company, at Alabama City, Ala.

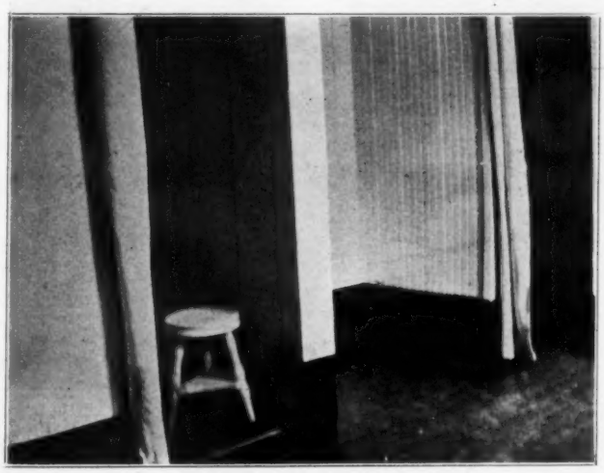
While it is impossible at this time to recount the complete history of all his social improvements at Alabama City that come under the general head of "welfare work," perhaps the details of a single branch of this work, when taken in connection with the accompanying illustrations, will make clear our meaning.

Between five and six years ago Mr. Moody visited the



Y. W. C. A. Building and a Glimpse of the Play Ground.

Y. W. C. A. establishment at the Monaghan Mills, Greenville, S. C., where the first Young Women's Christian Association in connection with a cotton mill had been started some three or more years before at the instigation of President Thomas F. Parker. Seeing the good it was accomplishing there, Mr. Moody, who always had the welfare of his own people in his heart, wished that the girls and the

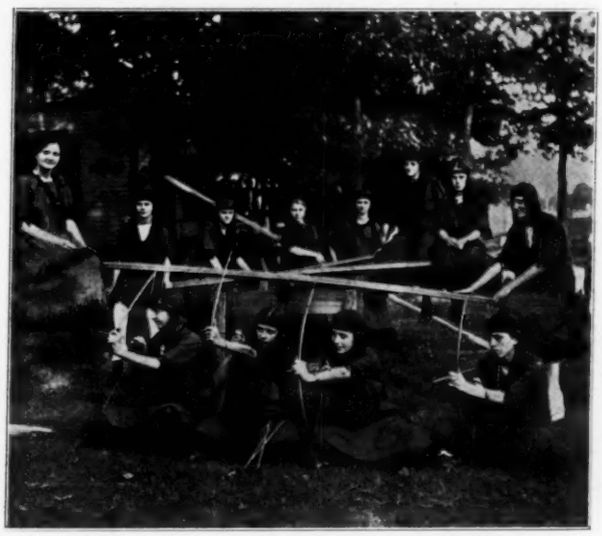


Shower Bath Room.

women of his mill might have the benefits of the Association also, therefore he interested the Dwight Company's directors in Boston and four years ago last January a domestic science and art teacher was secured. With the help of Miss Long, the special worker employed by the National Board of the Young Women's Christian Association, the

An Interior View in the Y. W. C. A. Building.

rooms in a large boarding house were turned into class rooms, and cooking and sewing classes started. The following June a general secretary arrived and a Young Women's Christian Association was organized in October with a membership of 118. Since then the building used for classes has been made most attractive and many improvements added. Last year, for example, a large reflectoscope was



Some of the Camp Fire Girls.

purchased by the company and much pleasure has been derived from its use.

Upon entering the Y. W. C. A. building one sees a large, homelike, attractive assembly and reading room, used for parties, clubs, embroidery classes, etc. Back of this is the cooking room which extends clear across the building. This room is well equipped in every way for individual class work and also for the serving of large suppers, etc.

Connecting with this room by double doors is a small sewing and dining room combined. The girls are taught here, during class periods, the proper way to set a table, to serve a meal and to act as hostess.

The other and last room of the building has recently been turned into a shower bath room. There are three shower compartments and four dressing rooms. The walls, ceiling and woodwork are all finished with heavy coats of white enamel, while the floor is finished in a light color. The heater also is covered with aluminum paint. This makes a very attractive and sanitary room.

In the same yard with the Y. W. C. A. building is the home for the two secretaries. This is a well furnished five-room cottage with bath between the two sleeping rooms.

The yard connecting the Y. W. C. A. building and the secretaries' home is the play ground. It is equipped with a sliding chute, swings of various sorts, see-saws, tetter-ball, quoits, horizontal ladder, basket and indoor baseball goals, vaulting standard, swinging rings and sand box, while a double "flying-jenny" is to be added soon. During the warm months all parties and club meetings are held on this play ground, which is well lighted with electricity.

A VIEW OF THE PLAY GROUND.

A CLASS SERVING THE MEAL JUST COOKED.

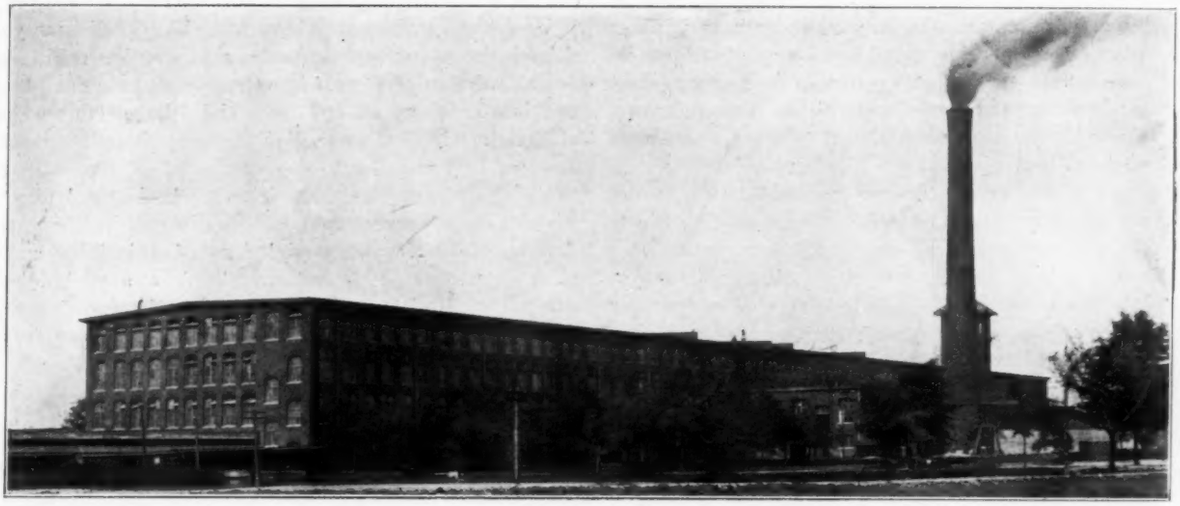
In the winters there have been cooking, sewing, embroidery, stencil and night school classes and club meetings of various sorts. The "Camp Fire" club has been meeting Monday nights for nearly a year. The "Blue Bird" club has just been organized among the girls from 11 to 14 years of age. The youngest Association members belong to the "Sunbeam" club. At the meeting of this latter club, Bible verses have been taught, interesting stories told, and two rooms of a large doll house furnished. Each little member has tried to live so as to bring sunshine to the lives of others.

The Association owns a loan closet, with sheets, pillow cases, gowns, ice-caps, hot water bags, etc., to loan out where there is sickness in the homes. The secretaries have always made house-to-house calls and Association visits, especially visiting and caring for the sick.

For the past three years delegates have, by bringing in memberships, earned their way to the Southern Conference at Asheville or Black Mountain in North Carolina. But this year Mr. Moody and the secretaries felt it wiser to have a summer camp near home where ten or a dozen girls might have a week of rest and outdoor life. This is to be at Little River, about thirty-five miles from Alabama City. Through the kindness of a friend of the Dwight Company, houses for this purpose will be furnished free of rent. There is a chance for swimming, boating and fishing, and also for interesting tramps around the country near by.

THE YARD AND COTTAGE FURNISHED THE SECRETARIES.

"Mr. Moody was always our kind and most interested friend and was never too busy or too tired to give us his time and helpful suggestions about the work," says one of the secretaries. "In his death not only the Y. W. C. A., but all who knew him feel they have lost a friend—especially so do those feel who have gone to him in time of discouragement or sorrow, as one always came away cheered and ready to do his or her best because Mr. Moody had the knack of making a person believe it was possible to do even more than you felt you were capable of doing."



ALABAMA CITY MILLS OF THE DWIGHT MFG. CO.

In this Y. W. C. A. work Mr. Moody was actively assisted by Miss Priscilla Voorheis, secretary of the Y. W. C. A., and Miss Hazel June Warner, domestic service teacher.

Besides this special branch of so-called welfare work, Alabama City has a large hall for entertainments, Lyceum lectures, etc.; a bowling alley and club house; a large, well-furnished lodge hall for the different secret orders; a recreation grove or park with dancing pavilion and band stand; and a bath house at one end of the lakes divided into separate parts for the use of men and women and containing about 50 dressing rooms.

AN OPERATIVE'S HOUSE.

The town itself is attractively laid out and in a manner that shows the careful thought and foresight of its designer. The streets are broad and level, well graded and provided with amply shaded chert sidewalks on each side. The usual churches and school buildings are suitably located, while opposite the Union Church is what is claimed to be the first library building to be erected in the state of Alabama. This is known as the "Howard Gardner Nichols Memorial Library," in honor of the first agent of these mills. The library is supplied with a diverse collection of books, all the leading magazines and many daily papers. A capable librarian is in charge and all uses and benefits are absolutely free to the mill people.

Alabama City also has the distinction of being among the few cotton mill towns with wainscoted and plastered houses. It is considered by all to be one of the most artistically arranged of the many cotton mill towns in the South. In riding through it one would scarcely know that it was a mill town for the houses are painted in different colors and

ANOTHER OPERATIVE'S HOUSE.

built in different ways, avoiding the conventional plan often adopted. The large yards permit of flower and vegetable growing which improves the general ensemble and prevents the crowded appearance so commonly in evidence when the houses are set closely together and all built after the same model. Thanks are due to Superintendent C. S. Wilkinson, of the Dwight Company, and to the young women secretaries of the Y. W. C. A. for the photographs and information included in this article.

IN MEMORY OF ONE OF OUR STAFF.

In the great scheme of life created by an Almighty God in which the idols of today are but memories of tomorrow and where the tomorrows are so soon todays and the todays yesterdays, it is often our lot to mark the passing of a friend and acquaintance. On July 26th, death, that makes no distinction of persons or places, swept down on its silent, chill-destroying wing, overtook in a very short earthly pilgrimage and carried away to the place unknown, and from whence no traveler has yet returned, the person of our beloved business manager. Such is the fate of us all, and as one by one in turn we go, the world moves on—we are soon forgotten, save that some traveler may chance to read the words of praise we may justly merit as recorded by those who have participated with us in the history of the past. We are tempted to inquire the reason in the words of the poet:

Leaves have their time to fall
And flowers to wither at the north wind's breath,
And stars to set—and all,
But Thou hast all seasons for Thine own—O, Death!

Mr. Herbert N. Mackintosh died July 26, following an operation on his brain and after a brief illness of 12 days. He was born at Liberty, Indiana, September 15, 1888, the second son of George A., and Helen Mackintosh. He received his education in the Cleveland high schools and Wooster University, graduating with the class of 1911, his work showing unusual mental power. He was an enthusiastic athlete, playing for three years on his college football team. For a year following his graduation, he was principal of the high school at St. Marys, Ohio, leaving this position to become business manager of *Electrical Engineering* and *Cotton*, published by the Cotton Publishing Company.

HERBERT N. MACKINTOSH.

Very few of our readers, perhaps, realize the importance of this cog that has been replaced in the machinery of our organization, yet each has in many ways felt his personal touch, if at all analytical in the study of what makes a publication and how it is maintained. If you read the advertising pages and are interested in the arrangement of the type faces that creates in you a desire to read these advertisements, if you are interested in the legibility of the printed page and the clearness of the illustrations, and if you notice the production of a better and better publication at the same price to you, then you realize what we have lost in the person of one who could make possible these things. Again and perhaps a closer relationship and one in which your attention without question has been called, is through those strong, convincing and courteous letters soliciting your subscription, a renewal or perhaps an overdue remittance. In the make-up of a great industry, we all have our places, and insofar as we all find them and fill them to our best ability, just in that proportion may that industry prosper and we in turn. Such was the belief of our departed brother and such was the spirit that he instilled into all with whom he came in contact. If efficiency in life's work, devotion to high and straightforward principles and a close observance of the golden rule, draw a reward hereafter, then he has a liberal one. The lesson of such a man is a simple one—a hard one—and a good one for all of us to study.

His body has perished and is buried, but the man lives on. His life work is left and his monument has been erected, not in marble or in stone, it may be, but in the memories of his friends, in the influence for good he wielded and in a moulded, rounded useful life which passes not away. After all, death is only the lifting of the thin veil separating time and eternity and as he left this earth, he simply went across to the other shore of the river to rest. While his place here is vacant, his name is recorded in the minds and hearts of those who knew him.

OBITUARY.

Marcellus Gould, president and manager of the New Hampshire Spinning Mills, Penacook, N. H., died on Friday, July 4, in his 57th year. An attack of pneumonia followed by a lingering illness of about six months was the cause of his death. Funeral services were held at his late home in Penacook on the following Sunday. He is survived by his widow and one daughter.

Mr. Gould was very well known in the cotton goods trade of New Hampshire, being connected with many mills throughout the state in his lifetime. He was with the Amoskeag Manufacturing Co., Manchester, N. H., for a number of years, later going to the Falls Co., of Norwich, Conn., where he was manager for about five years. In conjunction with A. B. Sanford he incorporated the New Hampshire Spinning Mills in 1899, and was elected president, which position he held to the time of his death. Mr. Gould was also a member of the New Hampshire State Legislature for a period of several years. He was a frequent contributor to COTTON'S practical discussion department, during the later years of his life, although always writing under a pen name. He was always deeply interested in practical mill problems and would do all in his power to render assistance to younger mill men in solving the problems of their business.

SOUTHERN TEXTILE ASSOCIATION.

At a meeting of the Arrangement Committeee held on August 4th, it was decidel to hold the fall convention of the Southern Textile Association at the Ansley Hotel, Atlanta, on Friday and Saturday, November 21st anl 22nd.

THE NEW WESTERVELT MILLS.

More and more the textile manufacturers of the South are becoming interested in the finer grades of cotton goods. This interest is taking form principally on plain goods, but there is also a distinct trend in some sections toward fancies. One of the recent examples of fine goods mill construction is the Westervelt Mills, at Greenville, S. C. This mill, which is equipped with 52,640 spindles, was incorporated in 1910. J. I. Westervelt, of Greenville, is president and treasurer; W. B. Smith, of Greenville, is vice-president, and C. E. Hatch, of Greenville, is secretary. The class of goods manufactured are fine lawns and linons, such as are made by the best of the fine goods mills of New England.

The main mill building is 130 feet by 423 feet, two stories high, with a monitor in the roof. The weave shed is 231 feet by 301 feet, constructed with saw-tooth roof and shafting area under the floor. Connecting the mill to the weave shed is the picker building, 114 feet by 60 feet, two stories high, with a dust room in the basement. The boiler house is 66 feet by 49 feet with a chimney 143 feet high, and is located to the west of the new buildings, as is also the cotton storehouse and cloth room. These occupy a building 102 feet by 205 feet.

The opening room is located under the cloth room and the cotton is blown through a conveyor pipe to the picker room. Leaving the picker room, the laps are carried through a covered passage to the card room on the first story of main mill. The stock, after being run through the preparatory machines, is then taken on an elevator to the second floor, on which are located the spinning frames, warpers, etc.

Leaving the warpers, the beams are carried by an overhead trolley conveyor system to the slasher room on the second floor of the picker building, from whence they pass

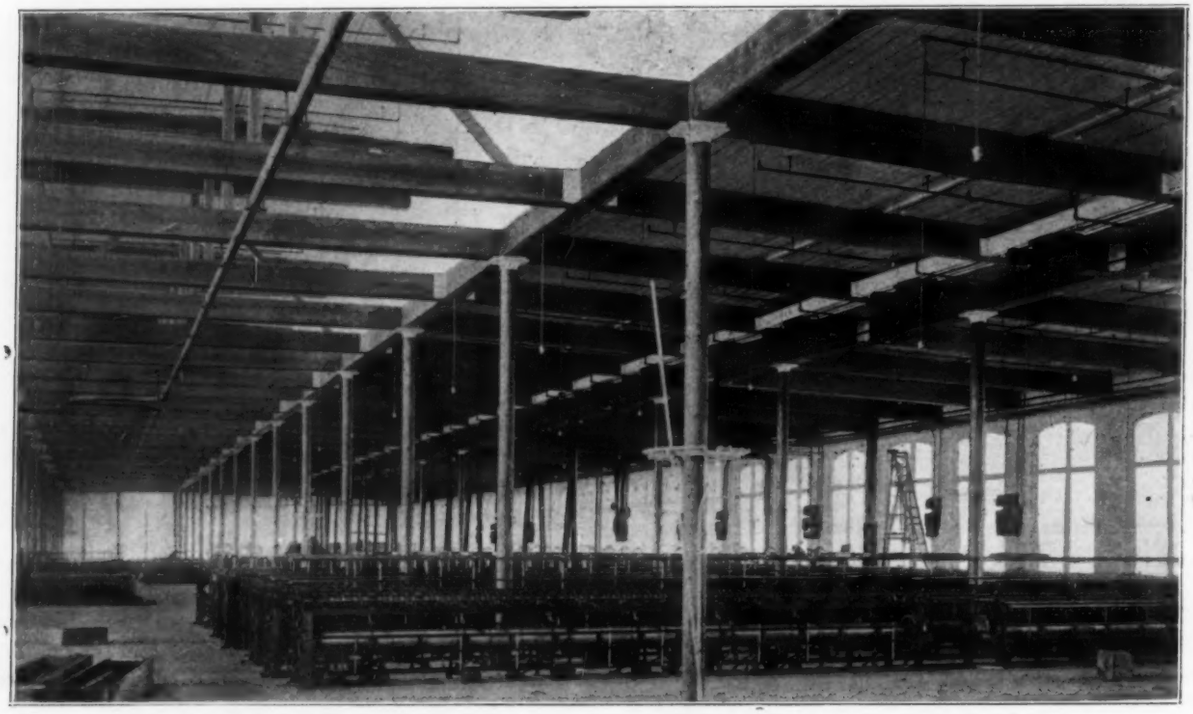
Interior of the Weave Shed at the Westervelt Mills Showing the Wide Bays and the Excellent Light from the Saw-Tooth Roof.

Westervelt Mills, Greenville, S. C.

through the warp tying-in room, down an elevator to the weave shed, which is connected to the cloth room with a concrete platform.

This mill is electrically driven throughout with A. C. motors of the three-phase, 60-cycle, 550-volt type. The group drive is used on the preparatory machinery, and the four-frame drive on the spinning frames. The weave shed contains 1,288 Crompton & Knowles looms, which are driven from shafting located in the basement, thereby insuring the greatest amount of light possible, by having all belts, pulleys, etc., underneath the working surface of the looms.

The buildings, which were designed by Lockwood, Greene & Company, of Boston and Atlanta, are of standard mill construction with steel floor beam framing in both mill and weave shed. The mill village consists of about 100 cottages, with store, church and school-house, and is located a short distance away from the mill.



A SECOND-STORY VIEW OF THE MAIN MILL BUILDING, SHOWING SPINNING FRAMES.

ANNUAL PICNIC AT THE CONE MILLS.

Fully 7,000 operatives, officials and visitors took part in the ninth annual picnic given complimentary to the employees by the Proximity Mfg. Co.; the White Oak Cotton Mills; the Revolution Cotton Mills; and the Proximity Print Works. This Cone picnic has become synonymous with Independence Day at Greensboro and people from all the nearby section attend.

Addresses were made by the mill officials and by the representatives of the operatives, the keynotes of all showing mutual confidence and dependence and a spirit of common interest for the common good. This mutual feeling of appreciation and respect is always in evidence at any gathering of officers and operatives at these mills and is one of the first of a series of related conditions to impress itself on the mind of a visitor.

The principal speech of the morning was the address of Caesar Cone, president of Proximity Manufacturing Co., of the White Oak Cotton Mills, and of the Cone Export and Commission Co. His subject was printed "A Message of Love and Esteem to My People," but with characteristic matter-of-fact manner, and not without humor, he declared that all the people knew of his affection for them, that deeds in that line were better than words, and that it would be more profitable for him to spend the time discussing some things of vital interest to his people.

His first fling was at the new tariff bill. He called the attention of the people to the newspaper reports of the 15,000 people out of employment in Lawrence and declared that they could never be sure that hard times were not coming. "They talk tariff to you," he said, "but don't you folks fool yourselves. You won't buy clothes much cheaper if we have free wool. Every workman in this country receives a just wage, and this wage is high enough to keep the decreased price of the material from lowering the woolen products considerably."

He told of a new system of prizes for efficient work, which will be adopted. Cash prizes of substantial amounts will be distributed for worthiness in such a number that one out of every eight operatives will receive one of the prizes.

Speaking of the reputation of the products which the members of his audience turn out as the result of their daily task, he told of an Australian who made the statement to him that in his country the denims and cotton goods from Proximity, Revolution and White Oak are in more demand than those from any other place in any other country on the globe.

One disappointment he expressed, and that was the fact that not enough of the mill people were taking advantage of the mutual benefit insurance association, whereby the operatives are offered excellent insurance at cost. And he ended with a quotation from Franklin's dictum, to the effect that saving a penny out of a dollar and spending that penny is the difference between happiness and unhappiness. Other

speeches followed, after which the prizes for well kept home premises were awarded.

Beginning at 12:30 dinner was served for all the seven thousand present, the menu consisting of the following: ham sandwiches, cheese sandwiches, hot frankfurter sandwiches, sweet and sour pickles, boiled eggs, sliced pineapple, bananas, sweet cakes, watermelons, hot roasted peanuts, ice cream, cake, lemonade, canteloup, and cigars. An enormous tent was erected to which the operatives went and were served dinners packed in cardboard boxes. A large table was spread for the owners of the mills, the officers and the visitors present. Delightful food was in the greatest abundance and profusion. Enormous quantities were left, which it is understood were distributed among the families at the mills.

The athletic events proved both interesting and amusing. Music was furnished by the Textile Brass Band, the White Oak Baptist church choir, and the White Oak Male Quartette. Every one had a good time and if some of the social reformers who are always criticizing Southern mill conditions would make an earnest effort to attend some of these and similar mill celebrations they might get a new "slant" on the attitude of the employers and the employees toward each other.

A PRIZE WORTH WINNING.

Not many young Americans are lucky enough to enjoy a vacation trip to Rome with all expenses paid and a chance to meet the King of Italy and the Pope. The Philadelphia Federation of Italian Societies, representing some three hundred thousand Italians in Pennsylvania, were justly proud when the Philadelphia Board of Education made their native tongue an elective study in the Central High School. A citizen of Philadelphia, says the New York World, offered a prize of a round trip to Italy to the student who should write the best essay on the history, art and literature of that country. The boy who won the prize sails this week on an Italian liner bearing a letter from the Mayor of Philadelphia to the Mayor of Rome. The American Ambassador will see that he meets the King, and an American Archbishop has given him a letter to the Pope.

The name of the donor of the prize is Hoffman, and that of the winner Eyster, which seems to indicate that a wide-awake interest in Italy is not confined to sons or grandsons of that nation alone. This is as it should be. More such travel prizes for public school boys in this country would stimulate study, provide useful vacations, and lay foundations for a broader American citizenship.

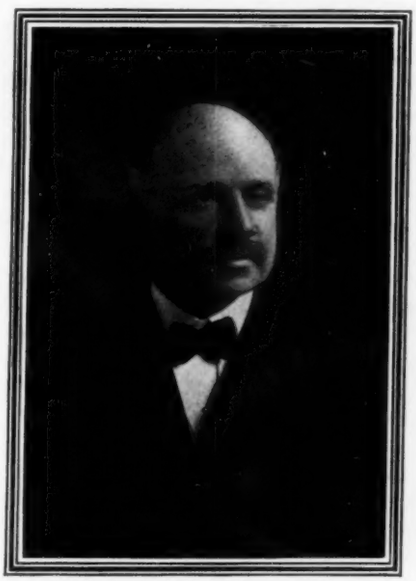
George F. Hoffman, the donor of the prize, and president of the Hoffman-Corr Co., Philadelphia, Pa., was born in Ashburnham, Mass., in 1863. He went to Philadelphia 25 years ago. Three years before he graduated from a business school at Poughkeepsie and started his career as a clerk in the freight office of the Boston & Maine Railroad at Fitchburg, Mass. When he went to Philadelphia it was as manager for the Steel Horse Collar Co. It was a good position, but he wanted a better one.

One day he answered an advertisement for a cordage salesman. Seven years later he was in business for himself. In 1897 he moved to the present site of his firm at 312 Market street, and in 1899 the firm name became the Hoffman-Corr Mfg. Co., by the admission of Colonel P. H. Corr, of Taunton, Mass.

Though his business has grown rapidly and he has always given it close attention, Mr. Hoffman has not neglected social pleasures. He belongs to the Union League of Philadelphia and New York, the Manufacturers' Club, is a director of the Patriotic Society of Philadelphia; a member of the Pennsylvania Society in New York; New England Society and Friendly Sons of St. Patrick. He is also a member of the University Lodge of Free and Accepted Masons, University Chapter, Mary Commandery and Lu Lu Temple, Mystic Shrine, and was at one time a director of the Philadelphia Chamber of Commerce and of one of the leading banks of that city.

A few years ago, during the industrial depression, he warmed the homes as well as the hearts of the poor in Germantown with a liberal supply of coal. Another time he gave them flour. For years he has entertained the Masons at the Masonic Home at a theatre party, and the newsboys have never forgotten the time he took them all out to the "Zoo" and sent them home each with a warm pair of gloves.

Cushing Academy, at Ashburnham, of which he is a trustee, he has remembered with a pavilion for its athletic field and prizes for various kinds of merit. In the village stands a shaft he erected to the memory of George Winchester, by whom his father was employed. He designed the official seal of Anniston, Ala., and gave it to the city councils.



GEORGE F. HOFFMAN.

One year ago he was suggested as a candidate for Mayor of Philadelphia and his name is sure to come up again less than two years hence, when candidates are again in the field. He, too, is a prize worth winning, and the citizens of Philadelphia should be proud of so worthy a nominee.

Several years ago Mr. Hoffman furnished a series of free band concerts in Vernon Park on Saturday evenings.

He was a Republican Presidential elector in 1900, and in the Founders' Week celebration last year he was chairman of the rope, hammock and ship chandlery committee.

Oarsmen all over the city of Philadelphia looked forward with eager expectancy to the day when the Schuylkill Navy held its annual regatta on the Schuylkill River. Much interest centered in the junior eights contest for the cup which Mr. Hoffman, the merchant and philanthropist, gave to the navy four years ago.

LOSSES IN THE GENRATION AND TRANSMISSION OF POWER.

(*Contributed Exclusively to* COTTON.)

BY HENRY KREISINGER, SCIENTIFIC DEPARTMENT, CLINCHFIELD FUEL CO., SPARTANBURG, S. C.

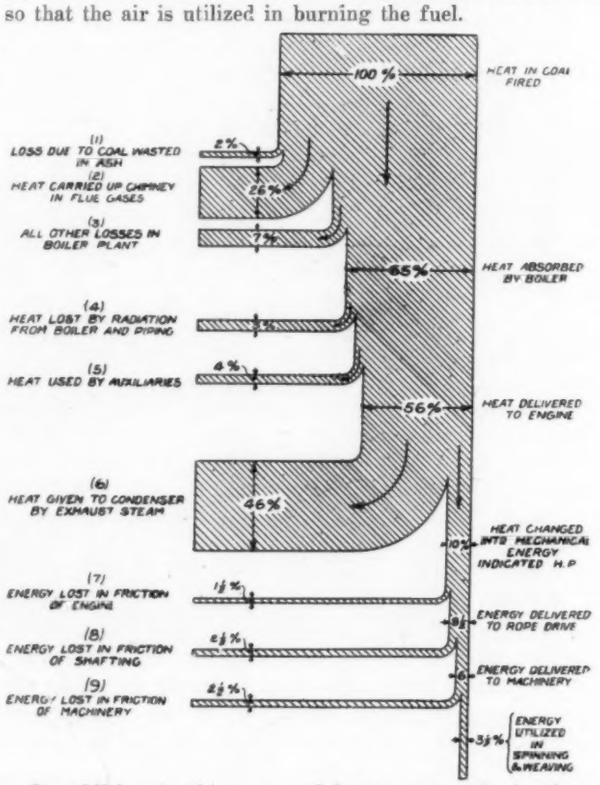
A steam power plant is a device to transform the heat of any fuel into mechanical energy. This process of transformation is always accompanied by losses which depend on the type and condition of the equipment of the plant. These losses increase as the condition of the power plant equipment becomes poorer. The mechanical energy developed by the engine may be still further wasted by friction in the bearings and by the bending of long mill shafting which is frequently out of alignment. A layman is usually much surprised when he is told that of the heat energy in the coal which is consumed under the boilers, only about 3½ per cent is actually utilized in spinning and weaving, and 96½ per cent of it is wasted in various ways during the process of power generation and transmission. To make these losses more easily understandable the accompanying chart has been prepared. The chart shows the losses in a well operated power plant of about 1,000 horse power, using a little less than 2 lbs. of a good grade of coal per indicated horse power hour.

In the chart the process of power generation is shown as a stream of heat starting from the coal fired onto the grate of a steam boiler and flowing toward the machinery of the mill where the mechanical energy is used in spinning and weaving. The branches turning away from the main stream represent the losses in the process of power generation and transmission. The width of these branches represents the magnitude of the losses.

The most striking feature which the diagram shows is that by far the largest part of the heat energy in coal is wasted, and only a very small part is delivered to the mill machinery to do useful work. The losses and their causes are as follows:

Loss 1. Some of the coal placed on the grate falls through the opening in the grate bars into the ash-pit and is lost in the ashes. This loss is very small and usually amounts to 2 or 3 per cent of the coal fired. If the coal runs 8 per cent in ash, then 2 per cent of carbon in the ash constitutes about 20 per cent of the total refuse in the ash-pit, or, approximately about one-fifth of the refuse in the ash-pit is carbon. This carbon in the ash often alarms the engineer because of its apparent high percentage, and he may attempt to reduce it by making the air spaces in the grate bars smaller. Although smaller air spaces in the grate may reduce the amount of coal falling into the ash-pit, they increase the tendency of the ash on the grate to form clinker, which must be pulled out through the furnace door. While removing the clinker the fireman pulls some coal along with it which may amount to more than has been saved from dropping into the ash-pit. Besides, while pulling the clinker the furnace door must be left open and a large quantity of air flows into the furnace and cools the boiler. Thus the purpose of reducing the openings in the grate bars is usually defeated. Even if any reduction in the loss of coal in the ash-pit could be attained, it could not be more than one per cent which is hardly worth attempting.

Loss. 2. The second loss shown on the chart is the heat held by the furnace gases and discharged through the chimney. To burn one pound of coal, 20 or more pounds of air is supplied. This air is admitted at a temperature of 50 to 90 degrees F. and is discharged at a temperature varying from 500 to 700 degrees F. according to the type of boilers and their condition as to cleanliness. Therefore, the gases flowing out through the chimney carry away the amount of heat required to heat them from say 75 degrees to 600 degrees F. As shown in the chart, this is by far the largest loss of heat in the boiler room. It may vary in different plants from 15 to 40 per cent of the total heat of coal fired onto the grate. It increases with the amount of air used to burn each pound of coal. If 40 pounds of air is used per pound of coal the loss of heat in the gases flowing up the chimney is about twice as much as when only 20 pounds of air is used for each pound of coal. A large quantity of air is needlessly used when the fires are run uneven and holes allowed to form in the fuel bed. Through these holes a large amount of air flows into the furnace, absorbs the heat produced by the combustion of coal and carries it out through the chimney. The air entering the furnace should flow in through a layer of hot fuel so that the air is utilized in burning the fuel.



In addition to this cause of large excess of air, there may be numerous cracks in the brick walls of the setting, allowing air to leak in, thus further increasing the chimney losses.

The loss of heat in the chimney gases increases also with their temperature; the hotter the gases are, the larger quantity of heat they contain and the larger the heat loss. The high temperature of the escaping gases is the result of a an inability on the part of the boiler to absorb the heat from the gases. Usually this inability is caused by a soot coating on the oustide of the boiler's heating surface, and scale or mud coating on the inside of the boiler. The thicker these coatings are the less heat the boiler can abosorb and the hotter are the gases when they leave the boiler, with the result that a large quantity of heat is carried up the chimney.

In the chart this loss is shown to be 26 per cent of the coal fired, which is the chimney loss in the average plant. As stated before, this loss may run up to 40 per cent in poorly kept and poorly operated boiler plants.

Loss 3. The third loss shown in the chart is the sum of all losses in the boiler room excepting the two already stated and discussed. It includes the heat carried away with moisture in coal and moisture formed by burning the hydrogen of the coal, and also the loss due to incomplete combustion of the volatile matter of the coal. It does not include radiation losses. In the average plant these losses amount to about 7 per cent. Ordinarily only a very small saving is possible.

The width of the main stream in the chart beyond the three losses so far discussed represents the amount of heat absorbed by the boiler.

Loss 4. The fourth loss shown in the chart is the heat radiated from the boiler and steam pipe. This loss may run from 3 to 10 per cent, depending on how the boiler and the steam line are covered with insulating materials, and the length of the piping. In a well kept plant this loss is about 5 per cent.

Loss 5. The fifth loss indicated in the chart is the heat wasted in running the auxiliaries such as the feed and the condenser pump. This loss is shown to be 4 per cent of the total heat of coal fired. It is the difference between the heat contained in the steam used in the auxiliaries and the heat taken from their exhaust steam for heating the feed water. Ordinarily the auxiliaries use about 10 per cent of the heat in coal for operation. Of this heat 6 per cent is returned to the boilers with the feed water and 4 per cent is rejected with the drain from the feed water heater and with the steam through the exhaust.

The width of the stream beyond loss 5 represents the amount of heat delivered to the engine; the chart shows this quantity of heat to be 56 per cent of the heat in the coal fired.

Loss 6. Of the heat delivered to the engine by far the greater portion is given to the condenser and only a small part is transformed into mechanical energy in the steam engine cylinder. The chart shows that the heat given to the condenser is the largest loss in the process of power generation in a steam plant. In the average plant this loss amounts to 46 per cent of all the heat in coal fired under the boiler. The heat that is changed into mechanical energy is only 10 per cent of the heat in coal and only about 18 per cent of the heat delivered to the engine, 82 per cent being lost in the condenser and carried away with the cooling water.

The amount of heat lost in the condenser water depends on the vacuum in the condenser, on the tightness of the valves of the engine and on the average load carried by the engine. The better the vacuum, the more heat is made available for transformation into mechanical energy. Steam passing through leaky valves generates no mechanical energy and the heat which this steam contains is wasted in the cooling water of the condenser.

The vacuum in the condenser depends on the temperature of the cooling water, on the tightness of the joints of the condenser system and on how well air can be removed from the condenser. The lower the temperature of the cooling water the better the vacuum.

The smallest amount of steam per horse power hour is used when the engine runs with a load a little below its rating. When the engine is overloaded or much underloaded, the steam consumption per horse power hour is large.

According to our present knowledge of themodynamics, a large part of the condenser loss is inherent in the steam cycle; that is, it appears that it is impossible to transform more than 1/5 to 1/4 of the heat delivered to the engine into mechanical energy.

The width of the stream beyond the condenser loss represents the heat that is converted into mechanical energy. It is the indicated horse power of the engine.

Loss 7. Part of the mechanical energy developed in the cylinder of the steam engine is absorbed by the friction of the moving parts of the engine. In other words, it is changed back into heat which often raises the temperature of the bearings to a dangerous point. The energy thus lost in the friction of the engine constitutes about 15 per cent of the energy developed in the cylinder or about 1 1/2 per cent of the heat in the coal fired under the boilers. The width of the stream beyond the engine friction loss represents the mechanical energy delivered to the rope or belt drive. In well operated plants, it is about 8 1/2 per cent of the total heat in coal.

Loss 8. Of the mechanical energy delivered to the rope drive an appreciable quantity is lost in the friction of the shaft lines in their bearings, and in the bending of long shafting when the latter is out of alignment, which is usually the case. The bending of the shafting is particularly a source of energy loss, and may raise the friction losses of the shafting to 40 per cent of the mechanical energy developed by the engine. In the chart this loss is shown to be 2 1/2 per cent of the total heat energy of the coal, or about 25 per cent of the mechanical energy developed by the engine. This is about what the loss is in a well operated plant.

The width of the stream beyond the loss due to friction of shafting represents the mechanical energy delivered to the spinning and weaving machinery.

Loss 9. A considerable part of the mechanical energy delivered to the mill machinery is lost in the friction of its moving parts. On the average, about 35 to 40 per cent of the mechanical energy is thus lost. This is a large quantity although its heat equivalent is only about 2 1/2 per cent of the total heat in coal. The amount of energy thus lost depends on how well the machinery is set, how clean it is kept and how well the running parts are lubricated. An experienced superintendent of a large mill told the writer that the reduction in the load on the engine was perceptible every time the grit and the cotton fibers were cleaned off the bearings and other running parts of the machinery. He added that he had the machinery of his mill scoured and cleaned about once a week.

The chart shows that of the heat energy of the coal fired under the boilers only 3 1/2 per cent reaches the work in the form of mechanical energy and is utilized in spinning and weaving.

The losses enumerated and discussed in the preceding paragraphs can be determined with any degree of exactness only with well planned, elaborate tests. It is impossible for any man to tell by simply looking over the plant equipment how much above normal each loss is. Furthermore, these losses may vary somewhat from day to day, and from season to season.

Mill Conditions and Market Reviews.

SOUTHERN MILL SITUATION.

(*Special Correspondence*).

The mill people of this section seem to be marking time until the tariff matter is settled, although there is a general belief that the tariff bill, even if passed in its present shape, will not really ruin the country, as some prophesied. There has been a decidedly better tone to the cotton goods markets in the last week or two, and it is believed that as soon as the mills and the commission people have gotten themselves released from the idea that any tariff revision is bound to result disastrously for the mills, conditions will become normal. Prices are stronger, if anything, with prospect for a further strengthening.

The cotton mills have been enjoying a fairly good business for the past twenty months, and despite the tariff agitation, there is a feeling that business will be on a firm basis this fall. Of course, the buyers are disposed to trade in a hand to mouth way at present, and have but little stock on hand, most of it being in the hands of jobbers and converters, but it is believed that when a little more confidence is restored, they will feel disposed to buy more largely and freely, and that the mills will have a very busy time filling up their depleted stocks.

The price of knitting yarns has held up very well. The knitters' business in hosiery and underwear has been and still is reported as excellent. It is believed that if the manufacturers will be content to sell in small quantities, there is no reason why the mills should not have good business ahead of them this fall.

The tariff proposition is being shaped up rapidly. Senator Simmons, of North Carolina, is quoted as saying that the bill will be passed by the Senate as early as the middle of August, and that it will be enacted into law by September 1st. The caucus has completed all the work. In a statement to The Washington Star, Senator Simmons says:

"I am confident that there will be no disturbance of legitimate business in this country as a result of the operation of this new tariff law. I am confident that it will result in relieving the people of the United States of many burdens from which they suffer under the present tariff law. It will lay the foundation of a greater prosperity."

This will give encouragement to the business interests of the country. Senator Simmons has his "ear to the ground" and has a pretty good idea as to what is going to happen, and the fact that he has predicted the enactment of the new tariff law at so early a date will serve to steady the course of business events.

Chairman Underwood announces that in the opinion of its promoters the measure would revise the tariff to a basis of legitimate competition, such as would afford a wholesome influence on American commerce, bring relief to our people in the matter of high cost of living, and at the same time work no detriment to properly conducted manufacturing industries.

In a recent issue of the Textile Manufacturer, published at Manchester, England, we note they predict that "when once the American manufacturers have adjusted themselves to the new rates—presuming they ultimately become law substantially as at present proposed—they will be in a better position to compete in the world's markets than they have ever been previously." It is to be hoped that this prophesy will become a fact if the present tariff bill is passed. Our less optimistic manufacturers, however, cannot see at this stage of the game where any radical reduction would even ultimately place them in an advantageous position to beat outside competition, and feel that no great change could consistently be made without injury to the domestic industry of cotton manufacturing.

In a recent interview with J. S. Wier, agent of the Atherton Mills, at Charlotte, and the High Shoals Company, at High Shoals, N. C., he gave as his opinion that the fundamental conditions over the country are excellent, and said:

"We have big grain crops; our wheat crops have been good, and the prospects for corn and cotton crops are very good, and if our crops turn out as well as we have reason to expect at present, there is no reason why we should not have excellent business this fall and the coming year. We will have to become accustomed to possible tariff revision, but we have been a good deal more scared than we will be hurt by it. The business in Europe, and with the English spinner, is very good, and his prospects continue good. He is busy, and we, too, would have had a good business had we not paralyzed it ourselves. We have been unduly excited over the impending change of tariff, and have talked ourselves into believing that if the tariff was tampered with at all it would mean ruin to the mills.

"The retail business over the country, so far as I can observe, is very good. The merchants in the small towns and in the cities are spending money; they are making additions and improvements, putting in new store fronts, and otherwise improving the interior of their store houses, which is a pretty clear evidence of the fact that they are making money. If they were not making money, they would put off this kind of improvement for another year. When the retail business over the country is good, it is bound to reach back to the primary market, sooner or later. The stock of textiles, cotton goods and yarns, is about as clean as they have been for five years. My idea of this is not based on my own condition, though our stock of sheetings at High Shoals is lower now than at any time in recent years. We are undoubtedly cleaned up; we have a mill with 16,000 spindles and we have only about 25 bales of goods of all descriptions on hand, and we have had no curtailment."

There is not much building of an extensive nature, though a great many small additions and improvements to mills have been noted.

Cannon & Co., formerly the York Cotton Mills, of Yorkville, S. C., are making extensive improvements, especially in the card room.

Howard P. Park, president and treasurer of the Park Cotton Mill, La Grange, Ga., has placed an order for about 2,000 spindles, with complementary machinery. This is to be placed in the old Park Mill, which has been idle for several years. This mill, which is equipped to weave 37-inch drills and has 2,000 ring spindles and 52 looms at present, will resume operations within a few weeks.

Work has begun on the new mill at Kannapolis, to be erected by the Cabarrus Cotton Mills, of Concord, and it is

expected to be finished by October or November. The new mill will have about 20,000 spindles.

George T. Andrews, treasurer and manager of the Enfield (N. C.) Hosiery Mills Company, has been in conference with the Chamber of Commerce at Newport News, Va., relative to establishing a hosiery mill at Newport News. It is thought that he will be successful in his efforts to secure a suitable building and sufficient labor for his mill.

The addition to the Anchor Mills, at Huntersville, N. C., of which Chas. W. Johnston, of Charlotte, is president and treasurer, is about completed, and they expect to begin operations very soon.

At Coal Creek, Tenn., the Business Men's League is organizing a company to establish a hosiery mill at that point, and is anxious to interest a manager who would be in a position to take $10,000 of the capital stock. The company will be capitalized at $50,000. M. H. Irwin, secretary of the Business Men's League, has the matter in charge.

The contemplated increase to the Cora Mills, at Kings Mountain, has been abandoned for the present, though they expect to eventually add to this mill either 5,000 or 10,000 spindles. Capt. F. Dilling is president.

The officials of the Delburg Mill, at Davidson, N. C., are planning to double the capacity of the mill, though they have made no purchases as yet. They manufacture knitting yarns, and have at present 3,888 spindles. J. Lee Sloan is buyer.

Organization has been effected by the Efland (N. C.) Hosiery Company, recently incorporated with a capital stock of $50,000, with M. P. Efland, president; Juhan J. Brown, vice-president, and John L. Efland, treasurer. They expect to manufacture hosiery, and the equipment will include a steam power plant.

The Echota Cotton Mills, at Calhoun, Ga., are planning to add 5,000 spindles to their mill. They now have 5,376 spindles and 144 looms on sheetings. No purchases have been made at the time this is written.

The Henrietta Mills, at Caroleen, N. C., expect to add more looms to their equipment.

Heard Bros., of Macon, Ga., are investigating machinery for cleaning and smoothing damaged pickings, warehouse sweepings, and all kinds of waste and low-grade cotton. Their purpose is not to manufacture, but simply to clean and smooth the cotton and get it in marketable shape.

E. A. Smith and George B. Hiss have taken active charge of the Thrift Manufacturing Co., (formerly known as the Thayer Mfg. Co.), near Charlotte, and orders for machinery have now been definitely placed, and they expect to begin operations as soon as the machinery is received and in position.

The Dayton Hosiery Mills, at Dayton, Tenn., have been incorporated by A. Beirne Andrews, A. P. Haggard, W. C. Godsey, and others, all of Chattanooga, with capital stock of $60,000. They will erect buildings and install machinery, Mr. Andrews being manager.

The Cleveland Mill & Power Co., at Lawndale, N. C., are adding a small extension to their mill, and building a new dye house. These buildings are to take the place of some older ones in which their dyeing and winding departments are now located, and which they will abandon. They will add no new machinery except a raw stock dyeing machine and a skein drying machine.

The Pioneer Cotton Mills, at Guthrie, Okla., have increased their capital stock from $150,000 to $250,000. They do not expect to add more machinery at present, but expect to increase the capacity of their mill at some time in the future. They now have 6,000 spindles, and manufacture cotton and seine twine, carpet warp, cordage and wicking.

The new machinery for the Rosemary Manufacturing Company's mill No. 3, at Roanoke Rapids, N. C., is being received by them, and the mill will be in full operation at an early date.

The Bibb Manufacturing Company, at Columbus, Ga., contemplate adding combers in the near future.

Fuller E. Callaway, of La Grange, Ga., has placed an order for a number of spinning frames, a part of these going to the Unity Spinning Mill, and the balance to the Elm City Cotton Mills.

Lois Cotton Mills, Douglassville, Ga., is adding a new slasher to their equipment.

The Banna Manufacturing Co., at Goldville, S. C., expect to increase the capacity of their mill shortly.

NEW ENGLAND MILL SITUATION.

(*Special Correspondence.*)

There has been but little change in the actual mill situation during the past month. Sentiment is better but profits are still very limited, and production is curtailed quite as much as it was a month ago. At Fall River the American Printing Company has been closed two weeks by a strike of 25 firemen. A start with new men is likely to be made at any time if an adjustment of troubles with the old men cannot be brought about readily. The Fall River Iron Works Mills that supply the American Printing Company with narrow cloths are still idle for the 12th consecutive week, and the time of re-starting depends wholly upon market conditions. At this time it does not seem probable that a start will be made in all the mills for several weeks.

New Bedford mills are operating about 85 per cent of the machinery and new contracts are coming in slowly. In other sections there is still a marked disposition to curtail and keep stocks low and confine the output to firm orders. It is the belief of mill men generally that New England warehouse stocks have not been so low in years. Fall River stocks of all kinds are estimated at less than 900,000 pieces and these do not include any substantial volumes of any single construction. In Rhode Island the mills and bleacheries are running somewhat better than they were a month ago, but a great deal more business could readily be handled if the demand for goods would show the measure of profit that will induce haste.

Little new machinery is being added. The largest single order in hand at the Draper Works is 1,000 wide looms for the Fall River Iron Works Mills. This order is expected to be the forerunner of a much larger installation whenever business conditions warrant a further investment. Had the Iron Works Mills continued to run in full it is easy to believe that the cloth markets would lack the stability that has characterized them since the last reports.

Print cloth sales have kept pace with the production and orders in hand will prevent any accumulation before September in the event of no further business coming forward. As a matter of fact, business in staple cloths has been steady enough to absorb all offerings and the markets have held generally steady because of the limited quantities of spots available. The printers and converters have endeavored to limit their demands to filling in requirements following the

placing of contracts in September. There are, of course, many contracts booked for extended delivery running through November, but as a rule the New England mills engaged on print cloth yarn constructions have not sought late business.

The business in bleached goods done a month or six weeks ago has kept standard cloths behind deliveries due, and there are very few spots available in the markets. The jobbers placed a substantial business for deliveries up to September on the best known branded lines, and there has been a good spot demand from the manufacturing trades. The bleached goods situation is perhaps in a better position than it was a month ago. In any case, the bleacheries are well employed on goods for quick shipment. More attractive prices were named at the opening of the season on fine yarn bleached cottons, and that has enhanced their distribution.

There has been some improvement in India linons and other sheer bleached cottons from combed yarns. The competition for new business has been on a more moderate scale this year for spring than it was a year ago, and there has been some slight hardening in India linon values in the past month. Some of the white goods houses report a larger demand this year for white batistes and crisp lawns, coming largely from the manufacturing trades. Bleached goods agents report a less marked demand this season for sub-count constructions. The prices on the standard goods are so close that when they can be had manufacturers of underwear prefer them rather than using sub-counts that may be hard to sell later on.

Staple ginghams are well sold for the next few weeks. The dress gingham market for the coming spring is being shaped up, but at this time the Amoskeag Company has made no price, and other factors are waiting until the big producer makes a move. Sales of several lines have been made subject to price adjustment later on when all prices have been named. It is not expected that there will be a large demand for dress ginghams during the coming season. The diversion of many looms to fancies of varied descriptions, and the large business booked by the Amoskeag Company on chambrays and bleached madras has precluded the likelihood of that concern producing as many ginghams as usual. Many other ginghams mills have also wound up their looms for novelty or fancy work. This may bring about a much better market condition for the staple dress ginghams that will be made, and may possibly do much to keep prices at or near their present level.

Tickings are well sold until September. Denims have been in steady demand for spot and nearby shipment, and some of the fancy denim looms and working suit fabric looms are well conditioned as to future business for the manufacturing and jobbing trades. The completion of the financial reorganization of the International Cotton Mills Company finds the duck market in a generally healthy position as to stocks and orders. Some business is being taken based upon the next cotton crop quotations as reflected on the exchanges, yet forward business of this kind has not been abundant and most of the demand is of a cleaning-up character. Stocks of staple numbers are low, and it is the belief of the largest duck factors that a good season is ahead if cotton does not run to high levels in October.

Concerning cotton, it is needless to say that most manufacturers look for lower prices toward the middle of October. Few mills speculate in that direction, and for the moment those in need of the staple must pay well for it if quality is sought.

The openings of fine and fancy cottons for spring during the past two or three weeks have not been attended with any large orders. The display of novelties and fancies has been of unusual variety and volume, and buyers have confined most of their advance business thus far to the extreme novelties. A great many ratines, crepes, mommies, and voiles are being made in plain and fancy weaves in all cotton and in silk and cotton. It is the belief of manufacturers that the American mills have never before shown such a varied collection of samples. Buyers who came to the New York markets were bewildered by the showing, and many of them made notes of various fabrics and stated that they would place business when salesmen made their regular calls upon them.

Poplins, cords and shirtings have been the principal staples ordered by the converting trade. Very much less than the usual volume of checks, plain fine weaves, and semi-fancy staples for white goods has been booked. Some of the fancy mills have full orders on a few lines and they expect to be hampered greatly in making deliveries because of the necessary reduction in the number of looms operated by a weaver because of the excess of novelties. It is not a year when mills or converters will take the ordinary risks on stock goods so that many mills have few orders worth mentioning that run beyond November.

To some extent the hesitation in placing business has been due to the tariff situation. In a larger degree, perhaps, the hesitancy can more fairly be attributed to the tight money markets. The buyers have been restricted by the financial managers of houses and the latter in turn have been forced to be mindful of not ordering merchandise while it remains impossible to sell commercial paper in any large way under 6 per cent. The jobber who must borrow to any extent cannot see a proft when money costs 6 per cent for a full season, hence it is the view of manufacturers that future buying will depend largely on the course of money, as well as the course of tariff readjustment and general crop returns.

There was no comfort for New England cotton manufacturers in the tariff bill reported to the Senate by the Finance Committee. Perhaps the most significant thing in connection with it is the strong petition of protest signed by the leading Southern and New England commission houses and selling agents and sent to Washington on the 22nd instant. The rates in the cotton schedule are so unsymmetrical as to appear ridiculous to many merchants handling domestic goods, and even to many of the importers.

The bill as it has been presented puts the work of readjusting domestic manufacturing conditions straight up to those who must deal with labor, as the rates are so low in many instances that labor readjustment will become imperative both North and South, if successful competition with the low-priced labor of Europe is to be met. The impracticability of readjusting labor costs downward 25 per cent in the present troubled conditions in the labor world is apparent to merchants and to manufacturers, but it does not seem to have impressed legislators as a serious matter in any degree.

There are many New England mill men who have fully concluded to accept the inevitable, which to them means one year of good business following good crops and empty

shelves, followed by a congestion of both domestic and foreign merchandise in retail stores and an impairment of the retailing capital of the country. They firmly believe that the new bill is so illy balanced that a very general disorganization of American merchandizing is sure to ensue. These things are not likely to be apparent to the average voter until they have been clearly foreseen by experienced traders and producers. But leading merchants and manufacturers believe they will become apparent when it becomes necessary to attack wage schedules or shut down many mills, pending the final readjustment that is unavoidable when new levels of trading values are set 25 per cent below those now current.

The affairs of the United States Finishing Company are becoming more settled. A reorganization is to be effected by the stockholders and the bankers have virtually assented to an extension of one year pending such action. Under the new management the works are now showing a steady profit, and business is not what can be termed good.

The long strike at the Draper Works ended in the final defeat of the I. W. W., and the elimination from Massachusetts of many false notions concerning the so-called rights of this revolutionary organization. The machine shops, as a rule, are running light, and will continue to do so until the tariff bill is out of the way.

COTTON CROP CONDITIONS AND A REVIEW OF THE MARKETS.

(*Contributed Exclusively to* COTTON).

BY H. AND B. BEER, NEW ORLEANS.

Owing to the continuance of favorable weather in all sections of the cotton region, the outlook for a large yield of cotton this year is more assuring than one month ago.

In Texas and Oklahoma prospects remain very favorable, all districts of the two states remaining uniformly good, which is something unusual owing to the large area covered, and if fairly good weather is had during the balance of the season, record yields will be made in these two states, combined, perhaps, 6,500,000 to 7,000,000 bales, against about 6,000,000 bales last season.

Conditions in the Mississippi Valley states show improvement for the month, especially in Tennessee, and in Mississippi and Louisiana and Arkansas in order named. It is said that the Mississippi Delta has the best prospects for the past five years, and the only complaint to make is the presence of the weevil in southern Mississippi and in Louisiana, but, as yet, no damage of consequence has been done, as the farmers are making a united fight against the pest, and seem to be successful.

In Alabama and the South Atlantic states a marked improvement has taken place since our last report of one month ago, Alabama and Georgia having recovered much of their earlier lateness, and the same may be said of the Carolinas. At the present prospects are good for an average yield in the southeastern states.

The crop was generally reported two to three weeks late, even in Texas. Nevertheless, Texas has already marketed three new bales, against only two to even date last year. Up to August 1st of last year Texas had only marketed 13 bales of new crop cotton. This year we anticipate a free movement of new cotton from South Texas the latter part of this month, and heavy receipts of new crop cotton in Texas next month, as the crop is opening rapidly in South Texas and is beginning to open in Central Texas, which is unusually early for the central portion of the state.

Trade conditions in England remain favorable, owing to the continuance of a good demand for cotton cloth from India, but Germany and France report the situation unsatisfactory, owing, perhaps, to the failure to settle the Balkan war, and the outlook on that account remains uncertain. In the United States the textile trade remains quiet, buyers taking from hand to mouth only, as it is feared that the new tariff will continue to effect business unfavorably.

The supply of cotton remains comparatively large, of American not much smaller than last year's record, of foreign production much larger than last year's record. The following showing the world's visible supply on the 11th of July.

Year	1913	1912	1911
American cotton	1,742,000	2,015,000	1,113,000
Foreign cotton	1,353,000	962,000	974,000
Total all kinds	3,095,000	2,977,000	2,087,000

As will be seen the world's visible supply of all kinds is about 1,000,000 bales larger than in 1911, in which year the 16,000,000 bale crop was made. This year present prospects are for as large, if not a larger crop than was made in that year, for while the eastern belt might fall short of that year by about 500,000 bales, prospects in the southwest are for about 1,000,000 bales more than in 1911.

While future weather conditions could very easily alter these prospects, nevertheless this is the situation as it exists today, and unless the weather should become very unfavorable, there is every reason to look for a large supply of cotton from the South this year.

Of late the American trade has become very much concerned regarding the proposal in Congress to tax cotton future contracts one-tenth of one cent per pound. This would be prohibitive, if not unconstitutional, as there are 50,000 pounds to the contract of 100 bales, on which the tax would amount to $50. The result would be, if such a bill should pass, that the American Exchanges would be destroyed, which would be to the advantage of Liverpool and foreign spinners where there is no tax on future contracts.

THE YARN MARKET.

The situation at the opening of the past month was what might be well termed mixed. There was a fair demand for single combed yarns, but the demand was not equal to the production. Eastern spinners were putting some of their machinery on carded yarns. There was some buying of 20's 2-ply yarn at this time, but prices were very irregular. The June business had been quite satisfactory, and some few manufacturers were buying yarn for fall deliveries, although not in as large quantities as had been the case earlier in the season. There were fair-sized inquiries for 30's Southern frame-spun cones, and there was a fair demand for coarse numbers for spot and quick dlivery. Most of the sales were made on the basis of 20½ cents for 10's for quick shipment.

The middle of the month found various rumors apparent in the yarn market regarding large fall contracts that have been offered on knitting accounts. Frame cone con-

tracts for October deliveries were reported to have been placed as low as 21½ cents for 24's, while spot yarns at 24's were quoted at this time at 24 cents. The commission men in the New York market found spinners much firmer during this period than they were and they did not place much credit to the report that contracts had been placed at the low prices reported. However, the demand for yarns was not broad in any sense, some knitters had difficulty in getting supplies, and many Southern spinning mills gave evidence of the fact that they had much business on hand that was unknown to the market. There was a good general undertone in the market, particularly in Philadelphia, and a much brighter outlook was predicted by many dealers. The buying of knitting yarns for spot and contract have been showing a gradually increased activity, but weaving yarns have been extremely weak. Buying was chiefly for spot and nearby delivery, as the dealers did not seem to be able to secure business into the new crop at any price. Spinners on their part were not seeking to force the market, and were content to sit by and await developments. There was a good business done in the staple numbers of the weaving yarns, and some trade has been quoted in September. Single warp skeins altered slightly, 20's single skeins bringing a price of 22½ cents. Two-ply yarns are unchanged, but there is left off the price cutting to get business. During this period two-ply skeins sold about as follows: 14's at 20½ cents; 16's at 21 cents; 20's at 22½ cents; 30's at 25 cents; 40's at 31 cents.

As the month closes, there is a tendency toward improvement noticeable in the Boston market, with coarse counts the best sellers, as they have been for some time past. The fine counts are about the same as they were. and some sales have been at the same prices for the same descriptions as were obtained in the latter part of May. In the Philadelphia market the demand seems to be up to normal for this time of the year, and considering the present tariff uncertainty and other difficulties, including the tightness of the money market, the demand is probably fully up to normal.

Following are recent quotations:

Southern Single Skeins.

8s	19 @19½	20s	21
10s	19½@20	26s	23½
12s	19½	30s	26
14s	20	40s	32
16s	20½		

Southern Two-Ply Skeins.

4s to 8s	19	24s	23½
10s	19½	26s	24
12s	20 @20½	30s	25
14s	20½@21	40s	30
16s	21 @21½	50s	40
20s	22 @22½	60s	48

Soft twist skeins, ½ to 1 cent higher.

Carpet and Upholstery Yarns in Skeins.

8s 3-ply, hard twist	17½	16s 3 & 4 slack	21
8s & 9s 4-ply slack	19½	2-14s cotton chain	20
12s 3-ply	20 @20½	2-16s cotton chain	20½

Southern Single Warps.

8s	19 @19½	20s	21
10s	19½L20	26s	24
12s	20	30s	26½
14s	20 @20½	20s	32
16s	21		

Southern Two-Ply Warps.

8s	19	24s	23½
10s	19½@20	26s	24
12s	20½	30s	25
14s	20½@21	36s	39
16s	21½@22	40s	30 @31
20s	22½@23	50s	40

30-1 on tubes .35.

Northern Two-Ply Carded Peeler Skeins.

20s	25½@26	60s-2	49 @52
22s	26½	40s	39 @40
24s	27	50s	45 @46
26s	27½	60s	49 @50
30s	28 @28½		

Southern Combed Peeler Warps, Skeins and Cones.

30s-2	35	60s-2	49 @12
36s-2	36	70s-2	60
40s-2	37 @38	80s-2	70
50s-2	42 @43		

Southern Single Combed Peeler Cones.

14s	25½@26	22s	27½@28
16s	26 @26½	28s	30 @30½
18s	26½@27	30s	32 @32½
20s	27 @27½		

Southern Frame-Spun Cones.

6s to 8s	20 @20½	22s	23½
9s & 10s	20½@21	24s	23½@24
12s	21 @21½	26s	24½@25
14s	21½@22	30s	26 @27
16s	22 @22½	36s	33½
18s	22½@23	40s	34
20s	23		

THE KNIT GOODS MARKET.

The beginning of the past month showed material progress being made by knit underwear mills in the selling of their production for the spring of 1914. The low prices that had been offered in many lines of cheap balbriggan underwear had caused business to come in rapidly for mills manufacturing this class of product. One well known line which made a price of $1.80 a dozen, or the same as one year ago, was reported to be entirely out of the market, the production having been already taken care of. Other mills that were quoting as low as $1.62½ had been doing a very large business, but at that time no reports had been received of their having entirely sold up. There was increased competition in union suits which was really the most interesting feature of this period.

As the month wore on, remaining lines of standard knit shirts and drawers were opened and some fair advance spring orders were placed on various lines. There were rumors to the effect that prices on cheap lines could not stand, but this is one of the things that will have to remain for the future to determine. The delay in getting the tariff question settled has placed many houses handling export accounts in a position where they stand little chance of doing any business for next spring. Several houses that have made arrangements to handle a number of foreign accounts, do not expect to do much before the next heavy weight season.

At the regular summer meeting of the jobbers association of knit goods buyers, which was held about the middle of the month at the Waldorf-Astoria, the special committee appointed for this work reported in substance that it was in favor of the establishment of a clearing house along the lines proposed in the various conferences of the committees of the Manufacturers association. The clearing house, it was understood, will be in charge of the secretary of the manufacturers association, who will receive information from the jobbers as to their requirements for labels and then give the printing order accordingly. The manufacturers will thus be able at all times to promptly secure the necessary labels for a jobber's order in the amount required and at the minimum cost. It is believed this plan will eliminate all the difficulties heretofore existing between manufacturers and jobbers on this label question and also expedite the filling of orders and do away with the extra charges prevailing at the present time. Another question taken up at this meeting was that of standard sizes for sweater coats. At the present time the size feature of this business is said to be in a chaotic condition resembling that existing in underwear before the reform was made by the jobbers organization. An address given at this convention by Wm. H. Ingersoll of Robert H. Ingersoll & Bros., created a great deal of interest and dwelt largely on the new reform society which is known as the American Fair Trade League. The particular object for which this society

is formed are to aid in the re-establishment and continuance of fair competitive commercial conditions. To promote honesty in manufacturing, in advertising and in merchandising, in the mutual interest of the consumer, the middleman and the manufacturer. To bring to public attention the existing evils of merchandising methods which operate to the injury of society. To act as a clearing house of information concerning trade practices and systems and the legislation relating thereto. To aid in securing the enactment and enforcement of laws, state and national, that will prohibit and penalize unfair competition; prohibit and penalize dishonest advertising; and prevent the elimination of the small retail dealer, who serves a necessary economic function. Also to secure to the public the benefits and protection of uniform retail prices upon all trade-marked and branded goods.

The close of the month finds many underwear buyers out of the market, having completed their line of stocks for the present. There is hardly a dissenting voice in the opinion that the spring buying started out better and more smoothly than was expected. In the hosiery line the market has been good and most of the initial buying is completed. Early applications for stocks were heavy, and some mills were booked with orders to the limit of their capacity within a few days of the opening. These refer principally to low price goods. There is a general tendency toward staple lines and the demand seems to center around 144 to 220 needle hosiery in plain colors. There has been considerable call for 25 cent mercerized hosiery and very large sales of artificial silk hose to retail from 25 to 50 cents. It is doubtful if any tariff condition that is liable to be put over by congress will affect the knit goods situation materially before the middle of next year or later.

COTTON MANUFACTURING.

DESIGNS FOR FANCY COTTON FABRICS.

(*Contributed Exclusively to* COTTON).

BY THOMAS WOODHOUSE AND JAMES IRELAND.

PART ONE.

[*In this series of articles the authors will not only describe the construction of cloth samples of their own providing and answer any questions concerning same submitted by the readers of* COTTON, *but they will also be glad to analyze and describe the construction of any sample submitted by any reader which is giving trouble or on which he desires information. Answers to such questions will be published in connection with the regular chapters of the article, only the name of the questioner being withheld.—Editor.*]

In these articles it is our intention to deal particularly with the various developments of fancy cotton weaving, but, in order to lead up to more or less elaborate types, and to explain the methods of illustrating the weaves of all kinds of fabrics, we propose at first to introduce one or two designs of the very simplest nature. Practically all the readers of COTTON will be familiar with plain or calico weaving, since this forms the bulk of the cotton trade, as well as, indeed, of all other branches of the textile industry. The coarsest plain cloths are woven with two leaves or harnesses, but the larger part is woven with four harnesses, and in exceptional cases six harnesses are used. It will be understood, however, that in all cases of plain calico weaving, whether 2, 4 or 6 harnesses be used, there are only two distinct sheds formed, *i. e.*, all odd threads are lifted on one pick, while all even threads are lifted on the other pick. In order, therefore, to make our methods of illustration clear to begin with, we propose to take these three cases, and to show the various ways in which the threads are drawn through the mails of the harness, or at least to show how this operation may be indicated on paper.

In practically all drafts, the various leaves, shafts or harnesses are represented by horizontal lines, the number of such lines naturally being identical with the number of harnesses in use; and, although this number is, in most standard cases, the same as that represented by the number of different lifts in the weave, the two may differ in special cases, for example, those indicated above, where 2, 4 or 6 harnesses may be used for only two different lifts of the threads.

The following different methods illustrated in Fig. 1 are used to represent the draft of the harness for plain weave, and in each case the weave accompanies the draft. In A. B. C. and D. the same plain weave, extended to 12 threads and 4 picks, appears immediately above the draft, but in each case the draft is shown in a different way. E. and F. show the arrangement when 4 or 6 harnesses are employed (6 harnesses are used only where the requisite number of heddles cannot be accommodated on 4, but 4 harnesses are

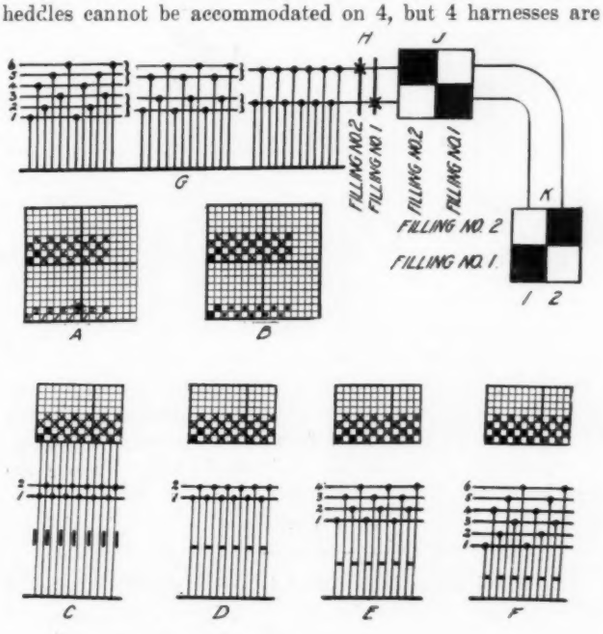


FIG. 1.

used, not only for distribution of a large number of heddles, but also to suit the top roller mountings, and to some extent to save redrawing of the warp when the 4 harness 2/2 twill is used). Drafts F. E. and D. are combined in diagram G, and it will be easily seen that the same threads appear on what may be considered two harnesses, if in part F

three harnesses, and in part E two harnesses are tied together and work as one.

The actual number of different lifts in any weave can be found by referring to the weave itself, and this number always represents the minimum number of harnesses which may be employed to reproduce the design. These different lifts, or orders of shedding, when placed side by side, give what is variously termed: the tramp or tread, the wyper or tappet plan, the lifting plan, the pegging plan, the card plan, the harness plan, or what might be universally termed the weaving plan. Some designers place this weaving plan on the end of the harness themselves, as shown at H., Fig. 1, where the crosses represent the lifting of the harnesses on the two filling picks. Others show the plan as at J, which is just a modification of the same thing; if, however, we consider that the two harnesses are bent at right angles, the weaving plan J will appear as shown at K. We intend to show most, if not all, of our weaving plans as indicated at K, where the vertical rows of small squares represent the lifting of the various harnesses, the latter being arranged in numerical order or sequence, while the horizontal rows of small squares represent the individual shots, picks or filling in one repeat of the weave.

The number of threads in one split of the reed is sometimes shown as at C by the thick, short, vertical lines; at other times the number is indicated by short horizontal rows connecting two or more threads, as in D, E and F.

We shall, in most cases, indicate the draft of the harnesses by the method shown at B, where the horizontal rows of small squares, taken in succession, represent the harnesses, the bottom one being that which is nearest the weaver. Adopting this method for the 2/2 twill, we illustrate two ways of drawing the harness, with the corresponding weaves and weaving plans which would be essential for the reproduction of the fabric.

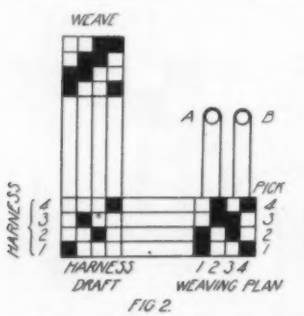


FIG 2.

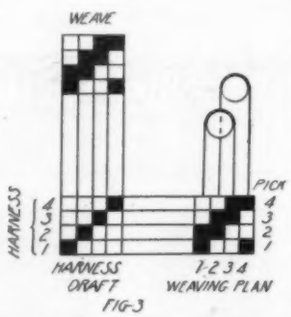


FIG 3

The usual draft for this weave is that shown in Fig. 2, in which case the top roller mountings A and B are arranged as indicated immediately above the weaving plan. The same design can be woven with the straight draft, but in this case the connection from the harnesses to the top roller mountings would be as shown in Fig. 3 above the weaving plan.

(*To be Continued*).

Unskilled labor in Bombay is paid monthly wages of $3.25 to $5.85 and consists mostly of mill hands, some of whom are given free quarters. Day labor is paid 12 to 16 cents per day or 20 to 24 cents for selected men; in some cases as much as 36 cents per day has been paid in stress of emergency.

These wars we are having don't help lessen the high cost of living.—*Atlanta Journal.*

DOBBY FIXING.

(*Contributed Exclusively to* COTTON).

BY THOMAS NELSON.

To a loom fixer who has never seen a dobby loom or worked on one, this loom has something about it which he dreads. This is not surprising, as at first glance to one not initiated into the art of fixing a dobby loom, the dobby seems to be a complicated piece of mechanism. For this reason, therefore, a description and sketch of the working parts of a dobby will be given first, the actual fixing of the dobby to follow.

Before giving these illustrations, however, a few points may be given to show the loom fixer on plain looms that things are not as difficult as they seem. In the first place, it must be clearly understood that it is the dobby only that will be described, and not the loom, the reason for this being that the loom to which a dobby is attached is practically the same as a plain loom and can be fixed by any plain loom fixer. Hence, it will be seen that the dobby is but one step in advance, or in other words, an additional motion added to a plain loom.

SINGLE ACTION DOBBY.

This style of dobby will be but briefly noted. Very few dobbies of this style are made at the present time. Only one knife and one set of jack hooks are used, so that to make a shed the harness must be raised from the bottom every pick. In other words, all the harness is at the bottom with the yarn just above the race plate.

The necessary harness is raised to make the shed; the shuttle is driven through the shed and then the harness descends again, the filling being beaten up into the cloth when the shed is closed. It will readily be seen that as the harness has to be raised from the bottom of the shed every pick and then lowered, the loom must of necessity run slowly. This, together with the fact that the filling has to be beaten up into the cloth in a closed shed, has been the deciding factors against this dobby. It is one of the well known principles of weaving that filling can be driven into the cloth easier with an open shed than with a closed shed.

There are, of course, many old mills which still use this style of dobby, but where they are in use it will generally be found that fancy lenos are being made on them. In fact, at one time this was the only dobby on which fancy lenos were made. Now, fancy lenos can be woven on any kind of dobby made.

DOUBLE ACTION DOBBY.

The dobby that is most extensively used is the double action dobby. As the name indicates, it is double in its action, that is, when an harness has been raised for, say, two picks, the harness is not lowered until the two picks are put in; or the harness can be kept raised for more picks. This gives an open shed motion so that the filling can be easily drawn into the cloth. This dobby is not, however, referred to or spoken of as a double action dobby, but generally as either a double index dobby or a single index dobby. The working parts of both these dobbies are practically the same, the actual difference between them will be explained under separate heads.

A sketch of the working parts of a double index dobby is given at Fig. 1. Each part is lettered and will correspond to the following terms: A, the harness lever; B and B^1, the jack hooks; C, jack; D, connection of jack with

harness lever; E, finger; F, a rod which passes through all the harness levers; G, a rod on which the ends of the harness levers work and are guided; H and H', the knives; J and J', the index fingers; K, a rod which passes through all

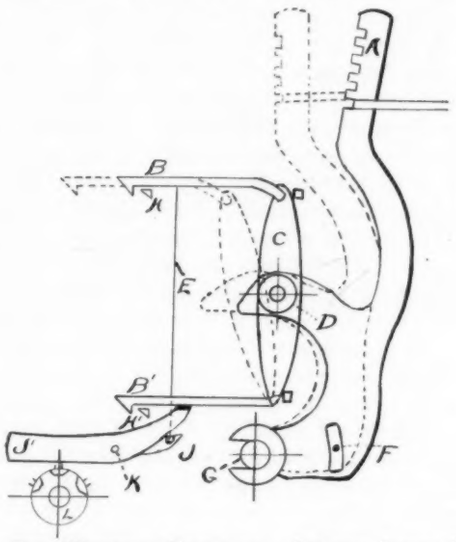


FIG. 1. THE WORKING PARTS OF A DOUBLE INDEX DOBBY.

the index fingers and is the fulcrum for same; L, the chain barrel.

In the sketch only one harness lever and connections have been shown, as this is all that is necessary. A dobby is known by the number of harness levers it contains, such as a 20-harness dobby, but all harness levers and connections are the same, therefore, when one is understood, the others are simply duplicates and may be treated as such.

It will be noticed that at the top of the harness lever A, there are a number of notches. These notches are for the purpose of regulating the lift on the harness shaft. The harness shaft is connected to the harness lever by a harness strap and a harness wire; this wire passing through a loop which fits in one of the notches in the lever. The dotted lines in the sketch show the position of the harness lever when the harness has been raised, and from this it will readily be seen that if the harness is connected to the top notch in the harness lever it will be raised much higher than it would have been had the connection been made to the bottom notch. As the front harness shafts do not require to be raised as high as the back harness shafts to form the shed, the loops for the front harness are put in the lower notches with the other loops gradually being raised in the notches as the harness is connected near the back. The jack C fits onto an offset on the extension of the harness lever. The jack hooks are riveted loosely to the jack and the top jack hook rests on the needle E. (In some mills the jack hooks and jacks are referred to as one part, namely, a jack, but the writer believes it to be preferable to separate them).

The lower part of the needle rests into the end of the index finger J. The bottom jack hooks rest on the index finger J'. The rod F passes through a round hole in the frame of the dobby and through all the harness levers. Its purpose is to keep the harness levers in contact with the rod G, and also to prevent the bottom of the levers from jumping out when the levers are being raised.

SINGLE INDEX DOBBY.

The working parts of a single index dobby are about the same as a double index dobby. The single index dobby is illustrated at Fig. 2. The distinctive difference between the two dobbies is in the method of operating the jack hooks through the index fingers and needles. A comparison of the two illustrations will show that in the single index dobby, only one index finger is used to operate the two jack hooks. The bottom jack hook rests on the end of the index finger and the top jack hook on the needle, the opposite end of which is in a cavity or groove at the end of the index finger. When the index finger is raised, both jack hooks are lowered at the same time and one of them will be pulled out by the knife that is coming out on that pick.

As one index finger operates both top and bottom jack hooks, only half as many index fingers will be required as is required for a double index dobby, because in the latter each jack hook is operated by a separate index finger. In a twenty-harness dobby, single index, there will be twenty index fingers, but in a double index dobby of this capacity there will be forty index fingers.

The knives are driven by two rocking arms, one in front of the dobby and one at the back. The rocking arms are fulcrumed in the center and can be driven either from the crank shaft or the bottom shaft in loom. Fig. 3 shows a rocking arm with connecting rod and crank. In the sketch shown the dobby is driven from crank shaft, but not

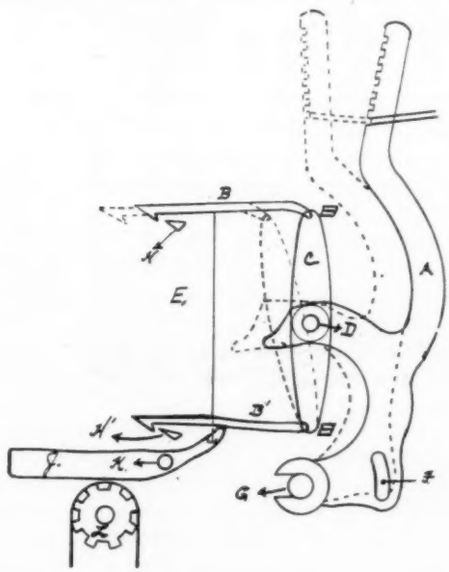


FIG. 2. WORKING PARTS OF A SINGLE INDEX DOBBY.

directly from that shaft. As this is a double action dobby and the crank makes one revolution for every pick, it is necessary to have a gear on the end of the crank shaft of, say, 30 teeth, meshing into one of 60 teeth, and from the last gear the driving crank is driven. In this way the top knife will be out when the bottom knife is in and *vice versa*.

If the knives are driven from the bottom shaft a longer driving arm is all that is necessary, this being connected to a crank which is set-screwed on that shaft.

The order in which the harness shafts are raised will depend upon the pattern that has to be produced, and the pegs will be put in chain so that the required harness will be raised. The chain barrel cylinder marked L is moved over for each pick as a single index dobby, but only makes one movement for two picks on a double action dobby; in other words, the chain barrel is driven in such a way that a chain bar is brought under the index fingers for every

pick on a single index dobby, but on a double index dobby one chain bar acts for two picks.

When a chain bar is brought under the index finger, a peg in the bar will pass under an index finger and *raise* same, which will in turn *lower* the opposite end of the index finger and thereby lower the jack hook. A chain bar is only brought under the index fingers when one knife is on its outward stroke and the other knife at its inward stroke, so that the hooks will be lowered in front of the knife which is on its inward stroke. When this knife comes out, that hook which is lowered will be raised. This same thing takes place with both knives when on the inward stroke.

On a single action dobby, when the index finger is raised by a peg in the chain, both the bottom and top jack hooks are lowered, because the bottom jack hook is directly in contact with the end of index finger and the top jack hook from the same finger through a needle. As only one knife can come out at a time, the knife that begins its outward stroke will be the one to raise the harness on that pick. If the same harness has to be raised on the next pick, a peg will be put in the chain on the next bar, and this will

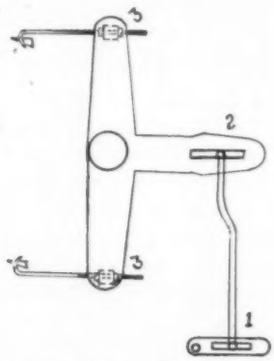


FIG. 3. ROCKER ARM WITH CONNECTIONS.

repeat exactly the same as before. The knife that is beginning its stroke will catch the jack hook and raise the harness.

On a double index dobby, exactly the same thing occurs as far as the peg raising the index finger is concerned. The difference is that on a single index dobby, each chain bar only represents one pick, but on a double index dobby the chain bar represents two picks, therefore, only one row of pegs are put in for the single index dobby on the bar, but two rows are put on each bar for a double index dobby.

The index fingers are arranged with one for the bottom jack hooks and one for the top jack hooks, so that one row of holes are pegged to operate the bottom jack hooks and the next row to operate the top jack hooks. In this way when a peg raises the index finger only one jack hook is lowered and the knife comes in contact with that jack hook and raises the harness. If that same harness had to be raised for the next pick, a peg would be put in the chain to raise the index finger on the next row in the chain bar, which would lower the corresponding jack hook and the same harness would be raised.

West Virginia's highest mountain is located in Pendleton county and is known as Spruce Knob. Its altitude, according to the United States Geological Survey, is 4,860 feet. The lowest point in the state is on Potomac river—240 feet above sea level. The average elevation of the state is about 1,500 feet.

THE ROVING PROCESS.

(*Contributed exclusively to* COTTON.)

BY H. C. W.

PART ONE.

The strand of cotton as delivered from the drawing frame is in the form of a loosely joined mass or sliver with the fibres straight and parallel to each other. Its strength depends upon the mass or size of the sliver and upon the clinging or adhesive properties of the fibres themselves. The diameter of the drawing sliver depends upon its weight and the amount it has been condensed. It usually varies from 3-8 inch to 1 inch. In order to reduce the weight of this strand or sliver a suitable amount, so that it may be spun into yarn, it is necessary to further draw it out. As the diameter is reduced, the strength of the strand is also reduced and it becomes necessary to put a slight amount of twist into the raving. This twist is only enough to make the strand of sufficient strength to draw off the bobbins in the succeeding processes. It varies and is dependent upon the weight or hank of the roving and the length of the staple.

The machine through which the stock passes during these reducing operations are known as fly frames, of which there are four. The first is known as the slubber and draws a single strand of drawing out into a reduced strand known as roving. It also puts enough twist into the roving to make it strong enough to unwind in the succeeding processes and winds the same upon a bobbin. The second fly frame is known as the intermediate and draws out two strands of slubber roving into a single strand of still finer roving, twists, and winds it upon a bobbin. The third process is known as the fine frame and the fourth as the jack frame. The fourth process is not generally used except in the manufacturing of high-grade fine yarns.

The mechanical motions and the methods of accomplishing the desired results are identical in all four processes. The only difference between them is in the sizes of the rovings for which they are suitable and the size of the bobbins they build. The coarser the work for which they are designed the heavier and more substantial the construction of the machine must be. The intermediate, fine and jack roving frames all have creels which hold twice as many bobbins as there are spindles in the frame. This allows two ends to be doubled and drawn out into one. The creels are adjustable in height to suit any size of bobbin.

There are three operations in the roving processes and they are known as drawing, twisting and winding.

The first operation, known as drawing, consists of reducing the two strands of roving doubled at the back to a single strand which is of the required weight or hank. A hank is the standard length of 840 yards, which is used to designate the size of a strand of roving or yarn. The size or hank of a roving or yarn depends upon the number of these lengths of 840 yards there are in one pound. That is, if there are two hanks in one pound, the roving is known as 2.00 hank roving. Roving containing 2.75 hanks per pound is known as 2.75 hank roving, and so on.

The drawing or reducing operation is accomplished by means of draft. Draft is primarily a ratio of surface speeds. For instance, consider two rolls, A and B, both 1 inch in diameter. A makes two revolutions, while B makes one revolution. The circumference of roll A is 1 x

3.1416, or 3.1416 inches. The circumference of roll B would also be 3,1416-inches. The surface speed of A would be equal to 2 x 3.1416-inches, or 6,2832-inches, and the surface speed of the roll B would be 1 x 3.1416, or 3.1416-inches, because roll A makes two revolutions to one of roll B. Therefore it can be seen that roll A has a surface speed twice as great as the roll B and would deliver a strand of roving just twice as fast as the roll B. It would also draw out a given length of roving delivered by B into a strand which would be just twice as long as the original. This is spoken of as a draft of 2. If the roll A made 3 revolutions while the roll B made one, then the draft would have been 3. Now suppose the roll A to be 1 3-8 inches in diameter and the roll B to be 1 inch in diameter, and suppose the roll A to make two revolutions while the roll B makes one revolution. Then the surface speed of A would be 1 3-8 $\times$ 3.1416 $\times$ 2 and the surface speed of B would be expressed as 1 $\times$ 3.1416 $\times$ 1 and the draft would be equal to

$$\frac{1\ 3\text{-}8 \times 3.1416 \times 2}{1 \times 3.1416 \times 1}$$

By cancelling the constant 3.1416 it would be expressed as 1 3-8 $\times$ 2 $\div$ 1 $\times$ 1 or a draft of 2.75. From the foregoing it can be seen that the surface speeds can be expressed as the product of the diameter multiplied by the revolutions. The draft is then found by dividing the surface speed of the front delivery roll by the surface speed of the roll which feeds the strand at the back.

Draft in all fly frames is obtained by means of three pairs of fluted steel bottom rolls, paired with leather-covered top rolls. The front leather top roll is usually of the shell type and the middle and back top rolls of the solid type. In very fine mills all three top rolls are often of the shell type and sometimes of the ball-bearing type. The advantages of the latter are easier running qualities, less chance of dry rolls, as they have to be oiled only once a year, and a cleaner, more even quality of work. A disadvantage is that they tend to clog up with lint. With a reasonable amount of attention, however, this disadvantage can be overcome.

Fig. 1 is a diagram of the draft gearing of an intermediate fly frame. The draft change gear A is carried on a stud with the crown gear B and can be changed to alter the hank of the roving produced. The gear C on the end of the back roll which is driven by the draft gear can also be changed. The back roll gear is usually larger than the draft gear and changes of a much smaller degree can be obtained in this way than by changing the draft gear.

Draft, as stated before, is a ratio of surface speeds, and in the cotton industry is the ratio the surface speed of the front, or delivery roll bears to the back or delivering roll. In determining the size of gear to produce a certain draft or *vice versa,* is is most convenient to use a draft constant. The draft constant really represents the amount of draft that would be obtained by using a one-tooth draft gear. The draft constant of the diagram at Fig. 1 would be expressed as

$$\frac{1\ 1\text{-}8 \times 80 \times 52}{20 \times 1 \times 1\ 1\text{-}8} = 208.$$

That is the one which appears in the denominator represents the draft gear and the 208. represents the draft which would be obtained by using a one-tooth draft gear.

Now, by examining the diagram, it can be seen that to reduce the draft the back roll must be driven faster and feed in more roving. It can also be seen that an increase in the size of the draft change gear will drive the back roll faster. Thus if the draft gear has two teeth the back roll will be driven twice as fast and just twice the amount of roving fed in. Then the draft would be reduced to just one-half what it was in the first case, or a draft of 104. If the draft gear had 52 teeth then the draft would be equal to 208 $\div$ 52 = 4. Thus it can be seen that the constant divided by the draft equals the draft change gear and the constant divided by the draft change gear equals the draft.

Now, suppose a .60-hank slubber roving is doubled in the creel of the intermediate and a 1.55-hank intermediate roving is to be produced. What draft change gear will be required? .60-hank roving doubled is equivalent to .30-hank

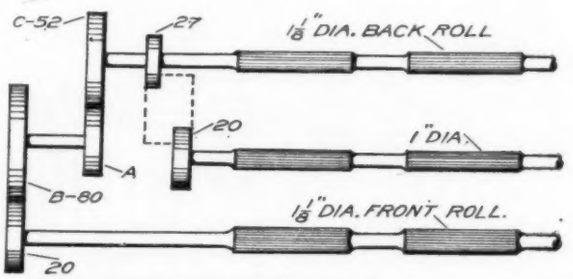


FIG. 1. DIAGRAM OF DRAFT GEARING OF INTERMEDIATE FLY FRAME.

roving. To reduce or draw out .30 hank to 1.55 hank requires a draft of 1.55 $\div$ .30 = 5.2. Now, 5.2 represents the required draft to reduce .60-hank slubber roving doubled to 1.55-hank intermediate roving. From the description of the use of the constant it is evident that the constant divided by the draft will give the required gear, or 208 $\div$ 5.2 = a 40-tooth draft gear.

To find the draft a certain gear will produce, the constant must be divided by the gear. For, if a draft of 5.2 is wanted and the constant, 208, is divided by the draft, 5.2, and a 40-tooth gear is found to be required, then this same 40-tooth gear divided into the constant will give the same draft or 208 $\div$ 40 = 5.2 draft.

Knowing the draft a certain gear will give, it is possible to find the draft any other gear will give by proportion. For example; suppose a 40-tooth gear gives a draft of 5.2, what gear will give a draft of 4.5? Now, as we are reducing the draft, it means that a larger draft gear will be required. Therefore an *increase* in the size of the draft gear will give a *decrease* in the amount of draft and therefore the proportion would be inverse and written thus:

Old gear : new gear : : new draft : old draft. Or as 40 : new gear : : 4.5 : 5.2. Solving, it is found that the new gear = 46.2, or a 46-tooth gear will give a draft of 4.5. In other words, multiply the old gear by the old draft and divide by the new draft.

It is often convenient to change the draft gear by proportion when changing a frame from one hank to another using the same roving in the creel for both hanks. For example; suppose a 2.00 hank roving is being produced with a draft gear of 30 teeth, what gear will be required to make 1.50-hank roving? As the weight of the roving is to be increased the draft gear must be increased also. But as an increase in weight of the roving means a reduction in the hank, it follows that a decrease in the hank of the roving requires an increase in the size of the draft gear. The proportion then would be written: 30 : new gear : :

1.5 : 2.00. Solving, the new gear = 30 × 2 ÷ 1.5 × 40-tooth gear required to produce 1.5 hank roving.

The three sets of steel drawing rolls are adjustable to the length of the staple being worked. Fig. 2 will show the method of accomplishing this. The front roll A is carried in a stationary bracket B which is held by a roll stand C, which in turn is bolted to the roller beam D. The middle and back rolls are carried on two adjustable brackets, E and F, which are moved back and forth on the bracket holding the front roll. In the diagram shown at Fig. 2, which is the method employed on some makes of fly frames, only one screw G is needed to set both rolls. It can be seen from the sketch that the bracket F holding the back roll slides on the bracket E holding the middle roll. This means that both rolls must be set at once, for if each is set independent of the other, the settings are liable to be upset.

There is another device that some makers use which

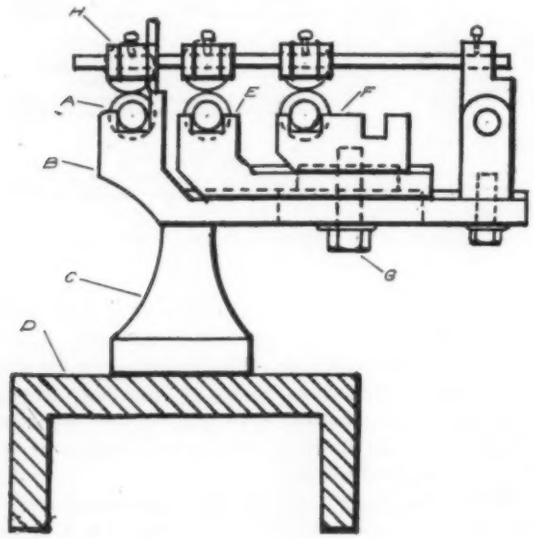


FIG. 2

allows the middle and back rolls to be set independent of each other. In this device both the stands E and F are carried on the stationary bracket B and may be adjusted by two separate screws G.

In adjusting the bottom steel rolls to the length of the staple being run, the distance between the centers of the back and middle rolls should be 3-16-inch longer than the length of the staple. The distance between the centers of the front and middle rolls should be 1-16-inch longer than the length of the staple. Thus in Fig. 1, for instance, if we were running cotton of 1 1-4 inch staple, the distance between the centers of the front and middle rolls would be 1 5-16 inch. Now, the diameter of the front roll is 1 1-8 inches, and the diameter of the middle roll is 1 inch, and one-half the sum of the diameters is 1 1-16 inch. This means that if we put a 1-4 inch gauge between the two rolls and set them up, the distance between their centers will be 1 5-16 inches. For the same reason a 3-8 inch gauge set between the middle and back rolls will give 1 7-16 inches between their centers.

The leather-covered top rolls are carried in the adjustable brackets H. This allows the top leather-covered rolls to be set directly over the center of the bottom steel rolls.

Fig. 3-A shows solid top roll, one-half in cut section. The boss of the solid iron roll is first covered with a layer of felt and then a tube of leather stretched on over it.

Fig. 3-B shows a type of shell roll. The shell in this type of roll is held loosely on the arbor.

Fig. 3-C is a diagram 1-2 cut section of a type of ball-bearing top roll which is meeting with great success among cotton manufacturers, especially in fine yarn mills. The shell A bears directly on the collar B, being held by a small spring C, which drops into a groove on the inside of the shell. This spring C prevents the shell A from dropping off while handling the roll and prevents any movement of the roll sidewise while running. The collar B bears on the small ball bearings D. The spindle or arbor E has one stationary collar F and an adjustable collar G. These collars hold the balls D in place. The collar G also is used to hold the balls tightly in place and to allow some means of tightening the bearing. The screw H is used to lock the collar G and gives an end bearing for the roll.

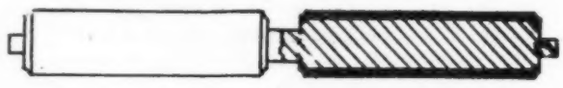


FIG. 3-A

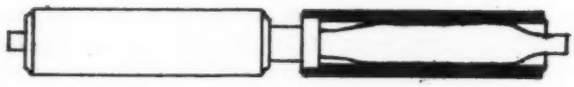


FIG. 3-B

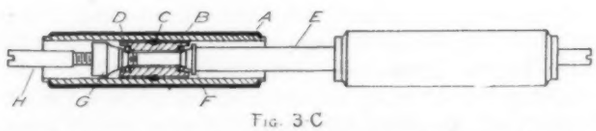


FIG. 3-C

This type of roll is very easy running, requires less weight and needs to be oiled only once a year. The balls are packed in vaseline and this usually lasts as long as the covering on the roll.

In fine yarn mills there is another type of roll used. This is the self-weighted roll, and is used in place of the back roll. By referring to Fig. 1 and computing the draft between the middle and back rolls it is seen that this amounts to only 1.20. Owing to this slight draft and the slow relative speed at which the back roll runs, it is possible to greatly reduce the weight on the back roll and still feed steadily and evenly. This has made possible the use of the iron, self-weighted back roll. The advantages are less weight and no re-covering expense.

This slight draft of 1.20 between the middle and back rolls is constant and almost never changed. The bulk of the draft comes between the middle and front rolls. The draft between the middle and back rolls is only enough to straighten the strands of roving and to start the twist.

Normal drafts for the four roving processes are as follows: 4 on the slubber; 5 on the intermediate; 6 on the fine roving frame, and 7 on the jack frame. These can be varied and changed to suit the conditions. They are more as a guide than a rule to follow.

TWISTING.

The strand of roving as delivered from the front roll can be likened to two thin, narrow strips of ribbon. In order that this strand of roving shall be strong enough to wind on the bobbin and draw off in the next process, it becomes necessary to put twist into it. This twist is of a slight amount. Only enough is needed to give the strand

sufficient strength to enable it to be wound onto the bobbin and drawn off in the next process. The amount of twist necessary in actual turns per inch is dependent upon two things: the size or hank of the roving and the length of the staple of the cotton being run. If too much twist is put into the roving it will not draw in the next process, and will make what are known as "hard ends."

The rule or method of finding the amount of twist a certain hank roving requires, is to multiply the square root of the hank by 1.2, which is the constant most universally used. This method works very well for the average grades of American uplands and Texas cottons. For longer stapled cottons of the Egyptians or Sea Island varieties, however, this method puts too much twist into the roving and makes hard ends in the next process.

When running long-stapled cottons, this constant, 1.2, should be reduced. This reduction should be in inverse proportion to the increase in the length of staple. Thus if we

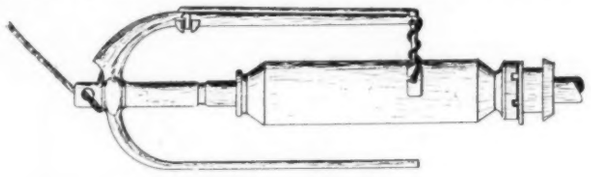


FIG. 4. A FLYER AND SPINDLE.

have Sea Island cotton of 1 1-2 inch staple, which is 3/2 of 1 inch, then the constant to use with this cotton would be 2-3 of 1.20, or .80, and the twist per inch would be found by multiplying the square root of the hank by .80.

The agent which directly puts the twist into the roving is the flyer which is carried by the spindle. Fig. 4 shows a diagram of a flyer and spindle and the method of threading the strand of roving. It is the turns around the top of the flyer and paddle of the presser that hold the roving and prevent it from turning in a direction to remove the twist. The strand is almost universally wound three times around the paddle of the presser. Some speeder tenders make a practice of winding the end around only twice. This should be discouraged and prevented, as it makes a soft, spongy bobbin.

Fig. 5 is a diagram of the twist gearing of a fine frame. The main driving pulley A runs at 400 revolutions per minute. The spindle driving gear B is keyed and setscrewed to the main driving or jack shaft C and through a series of gears drives the spindles. From this diagram it is seen that the spindles are driven at a speed which is always constant. Thus in Fig. 5 the spindles run at a speed of 1254.5 revolutions per minute.

$$\frac{400 \times 60 \times 46}{40 \times 42} = 1254.5 \text{ R.P.M.}$$

This speed is constant and never changes.

At the other end of the jack shaft C, is the twist change gear D, which drives the top cone shaft E. This shaft carries at its outer end the 97-tooth gear which drives the large 164-tooth gear on the end of the front roll F. The front roll F has a diameter of 1 1-8 inches.

It can readily be seen that the front roll, as well as the spindle, is positively driven from the jack shaft C. The method of changing the amount of twist is by varying the speed of the front roll. As the middle and back drawing rolls are driven from the front roll, this does not change the draft.

The twist change gear D is the most important change gear on a fly frame. It not only drives the front roll at the required speed to obtain the correct amount of twist, but also drives the cones, compound, lay gearing, tension gearing; in fact, it drives everything with the exception of the spindles. It is therefore necessary that careful attention be paid when changing this gear. The small 38-tooth intermediate gear is carried on a swinging stud and can be set to mesh with any size of twist gear.

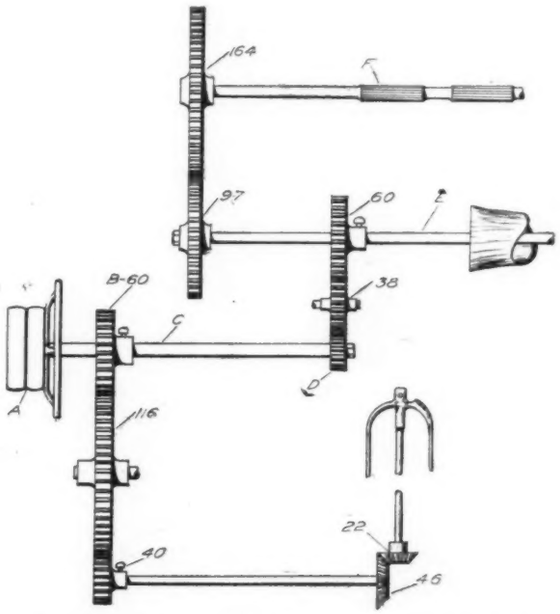


FIG. 5. THE TWIST GEARING OF A FINE FRAME.

As stated, twist is put into the roving through the rotating action of the flyer. The number of turns per inch is dependent upon the number of revolutions the flyer makes while the front roll is delivering one inch. The twist constant, therefore, represents the number of turns per inch put into the roving by a one-tooth twist change gear.

(To be Continued).

THE AMERICAN MERCHANT MARINE.

Hunter Little, in the current issue of the *American Exporter,* presents some very interesting facts in connection with the American Merchant Marine. In 1912 there were 196 ships flying the American flag as compared with 176 similar German ships and 126 carrying the French colors. One large German steamship company is now asking bids from American shipyards for building in this country six large ocean steamers. In coastwise trade the United States leads the world with a tonnage of 6,782,082. The article is well illustrated with half tone reproductions of many American built ships.

The progress made by electric power transmission in India from 1896, when the first hydro-electric plant was installed, is set forth in a book published by the Indian Textile Journal, of Bombay. The book, which is illustrated by numerous photographs, deals mainly with the history of the Tita electricity works to the end of April last, and notes are included on the Bombay mill industry, the electric drive in textile factories, the world's water power, and hydro-electric energy in Japan.

KNITTING.

THE MECHANICS OF KNITTING.

(Contributed Exclusively to Cotton*)*

BY WILLIAM DAVIS, M. A.

In a former article on the mechanics of knitting, the method of producing plain and rib stitches on the ordinary flat latch needle knitting machine was discussed along with the very interesting modifications produced by the addition of the Jacquard attachment. The needle beds were seen to be inclined at right angles to each other and the needles were placed in each bed, remaining there during the working of the pattern. When the two needle beds were worked in conjunction, rib fabrics were produced. Suitable alteration in the cam arrangements caused the fabric to be made thicker and more bulky by the insertion of double courses in the form of tuck work.

The fabric which forms the subject of the present article is one totally different from the usual run of knitted fabric by reason of its construction. The pearl stitch has characteristics which are quite its own and enable it to occupy a distinct place in the knitting industry. It is the result of introducing back fabric stitch into the face fabric stitch. Now this has various effects. The ordinary face fabric stitch is more or less vertical in character, made up by the straight portions of the loops following one after the other lengthwise in the fabric. Turning to the back of the fabric we see that the semi-circular portions of the loops occur more or less in a horizontal direction and, so to speak, dovetail into each other.

Another result of introducing back fabric stitch on the face is to produce a fabric of variable surface, the back fabric portions appearing considerably higher than face fabric portions. To introduce back fabric in large portions or basses on the face is, however, undesirable from the point of view of fabric structure because the cloth suffers in stability. Under very small tension the surface flattens and the effect is lost. Further, the point of transition from face to back fabric shows up as a large stitch or hole when stretched. To obviate this defect it is usual to break up the large basses of back fabric by making them one course back fabric and one course face fabric, so that the levelness is retained.

The fashion for the pearl fabric changes as in other departments. For the past two years the taste has been in the direction of very heavy yarns of 4 or 5-ply knitted on a coarse gauge frame of only a few stitches per inch. The taste for the moment has gone in the direction of finer yarns, and consequently finer gauges. This change in fashion is often a serious one for the knitting manufacturer because it causes him to install a new series of machines of different gauge. It is further a matter of constant speculation with him as to whether it will be advisable to try to cope with the new fashion, because no sooner has he done so and changed the character of his plant than fashion has decreed some other innovation. This is specially the case with outer garments for ladies wear. There is much to be said in favor of having the pearl fabrics in a coarse gauge with a thick 5-ply yarn. The patterns can be much more easily produced because a minor alteration in stitch produces quite an ornamental effect, and the variation in the surface height is all the more pronounced. When the yarns are reduced in size it takes a larger pattern arrangement to be effective, very often the introduction of a Jacquard being necessary.

A view of a machine used for the production of the fabrics under consideration is given at Illustration A, and it will be interesting to point out the general features. The machine beds in which repose the needles and their adjustments are flat and in the same plane. As will be seen later, the needles can be worked from either of the two beds by cam boxes which will be recognized as resting above the beds in the illustration. The handles seen on either side of the cam boxes are very important because it is by their working that all the patterns are produced. The handle has three positions into which it may be placed, on the right, on the left or in the center. Perhaps the part of next importance is the shogging handle on the left-hand

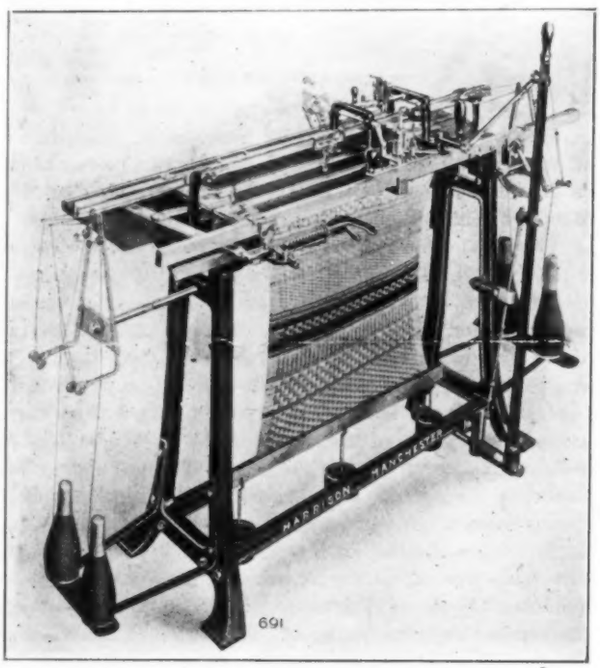


Illustration A.

side of the machine where the large number of teeth will show the distance it is possible to move the back bed. Now in shogging on an ordinary flat knitter, it is not possible to shog the bed more than one, or at the most, two needles at once, because of the danger of bursting the yarn in stretching the one bed away from the other. In the Pearl machine, however, all the needles are worked from the one bed only, either the front or the back, so that the shogging has not the effect of twisting the yarn in any way. The shogging is used to introduce variety into the pattern and the exact manner of doing this will be explained later.

Other well-known features will be recognized such as the counter indicator at the back to register the number of courses worked as a check on the length. The yarns are placed on large bobbins at the side and arrangements are made for the introduction of more than one color into the cloth. We may say, however, that the pearl fabric has developed very little in the way of fancy color ef-

feets because the stitch itself is considered to be enough of ornamentation. The colors are mostly solid and fresh in hue. At the beginning of the season certain shades are selected by the buyers as predominant and the bulk of the trade is done on those lines. The machine is worked by hand but a large production is possible because of the coarseness of the gauge. Another advantage is that fashioned garments can be produced by the worker shifting the edge stitches farther out or in to increase or decrease the width as required. One of the great draw-backs to a free manipulation of the machine lies in the ease with which the latches of the needles are broken off. A latch opener is necessary to insure that the latches will be all open for the reception of the yarn, and the least hitch causes the latches of the needles to snap.

Formerly the scope and development of the pearl stitch was much restricted by the laborious methods necessary to produce it. On flat frames of the spring needle type it was necessary to remove the stitches from one set of needles to another set before knitting could take place. The two sets were arranged at right angles to each other, the one set knocking the stitches over towards the worker. After

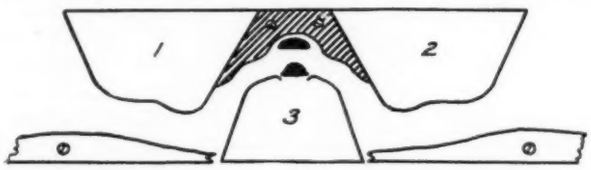


FIG. 1.

FIG. 2.

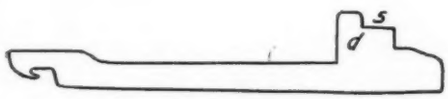


FIG. 3.

FIG. 4.

transferring the stitches bodily on to the other set of needles a course was formed which knocked its stitches over away from the worker. Now it will be self-evident that such a method could not but be extremely cumbersome and slow and the introduction of the latch needle with the double end or hook signalized the start of a new era for the pearl stitch.

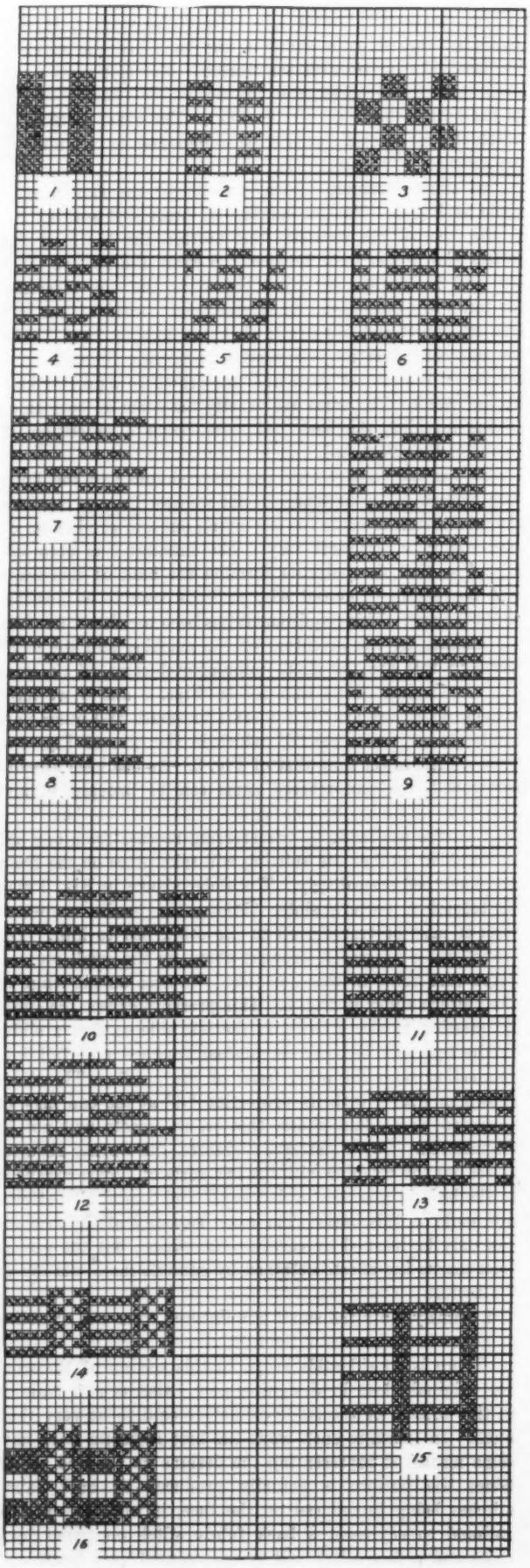
A sketch of the needle is given in Fig. 2, where the two hooks, "a" and "b" will be noticed, "a" having the latch open and "b" closed. Unlike the ordinary type of latch needle, the double ended needle has no butt or heel from which to receive its motion, but acquires its movement from a jack or slider such as is shown at Fig. 3. For each needle there is such a slider in both front and back beds and they are made to fit into hook "a" or hook "b" at will. Only one slider can be in touch with the needle at one time. If the needle is worked by a slider in the front bed, the stitches are knocked over away from the worker, if the needle is worked by a slider in the back bed the stitches are knocked over towards the worker. The motion is communicated to the slider and the needle by cams working on the butt or heel "d" of the slider. The exact method in which this is carried out will be understood by a study of the interior of the cam box.

An exact facsimile of the interior of the cam box is given at Fig. 1. The set consists of cams 1, 2 and 3. As in the case of the ordinary flat knitter, the butts of the sliders run in the path between the cams and receive their out and in motion to knit. Going in the one direction the butts are pushed out to receive their thread by the left side of cam 3 and are drawn down to knit by cam 2. In the opposite direction the right side of cam 3 pushes out the butts to take the yarn and are drawn in again to knit by the cam 1. The cams are exactly the same on both sides of the machine, the back bed cams being a repetition of those on the front bed.

So far the construction has been simple and the knitting process easily understood, but we now have to consider the arrangements made for the laying out and production of patterns in a practical way. The machine has been designed so that the patterns forming the bulk of this trade will be readily produced with as little trouble as possible to the worker. This requirement has been met in an admirable manner by the inventors of the machine and the chief parts in this are the small unnumbered cams of the cam box shown just above cam 3. In Figs. 3 and 4 we have sliders, which are exactly the same in length and other particulars except the heel "d" which in the case of Fig. 4 is fixed a little lower than that of Fig. 3. As has been already mentioned, the unnumbered cams can be brought in and taken out of action by the handle above the cam box.

Patterns are made by transferring needles from one bed to the other so that the knitting will take place on the front and back bed accordingly. The slider shown in Fig. 3 may be termed a pattern slider because the needle connected with it may be transferred to the other bed to knit. The transferring process is brought about by the small unnumbered cam being in work, so that it presses on the ledge of the pattern slider in Fig. 3. This pressure causes the slider in question to rise a little on the left side so that a slider in the opposite bed can be pushed forward and fall into connection with the other head of the needle. The slider shown in Fig. 4 with its projection "d" at the end may be regarded as a plain slider, that is, its needle will not be transferred. For a pattern, therefore, the worker requires to set out the machine with the two sorts of sliders arranged in the beds in a certain order, say 7 and 3, and all patterns are made on this basis. The exact capacity of the machine can only be learned by careful observation, but the worker soon learns the effects obtained by suitable manipulation of the handle. There are three positions possible on any one bed, namely, both the small unnumbered cams out of action or either in action while the other is out of action.

There is considerable scope in this section of the work for original ideas in designing new patterns and training in this branch of the trade cannot be said to be very thorough. In teaching such work the first requisite is to have some means of representing the designs on squared paper. Since the pattern is actually produced by back fabric stitches being introduced on the face, it would seem most rational to represent a back fabric stitch on paper by a cross and a face stitch will be represented by a blank.



In making a range of patterns the operator has first of all to select some order of placing plain and pattern sliders in the bed and when this has been decided he sets to work to produce as many varieties of this arrangement as possible. Let us suppose that a three and three scheme has been decided upon, the pattern shown in Design 1 may be most easily produced, where we have three rows of pearl and three rows of plain stitches arranged in the form of a stripe. As has already been indicated, when back fabric stitches appear continuously on the face the level of the fabric is considerably raised at that point and an element of instability is introduced into the fabric. The shape of the article is also difficult to fix upon because of the excessive stretch.

A much more practicable pattern is shown at Design 2, where the solid stripes of pearl have been varied by alternate rows of plain, this pattern is much more successful in effect and appears quite ornamental. In Design 3 the needle bed is shogged 3 needles every three courses so as to obtain the 3 and 3 basket effect shown, an improvement on this is given at Design 4, where the solid basses of pearl stitches are varied by a solid row of plain stitches. For the moment basket effects are much in demand for knitted coats, but manufacturers would do well to turn their attention to the twill and diagonal designs for the future. Such patterns are capable of infinite variation in the way of herringbone or zig-zag effects and all are obtained by a simple manipulation of the shogging handle on the machine. At the present the use of the twill effect is confined to an edging for knitted coats that extends about 2 inches down the front and along the bottom of the coat. Such effects are quieter and a tasteful mode of toning down what in itself would be a rather showy pattern. A useful variety of the 3 and 3 twill is given in Design 5, which is arranged with alternate rows of plain stitch.

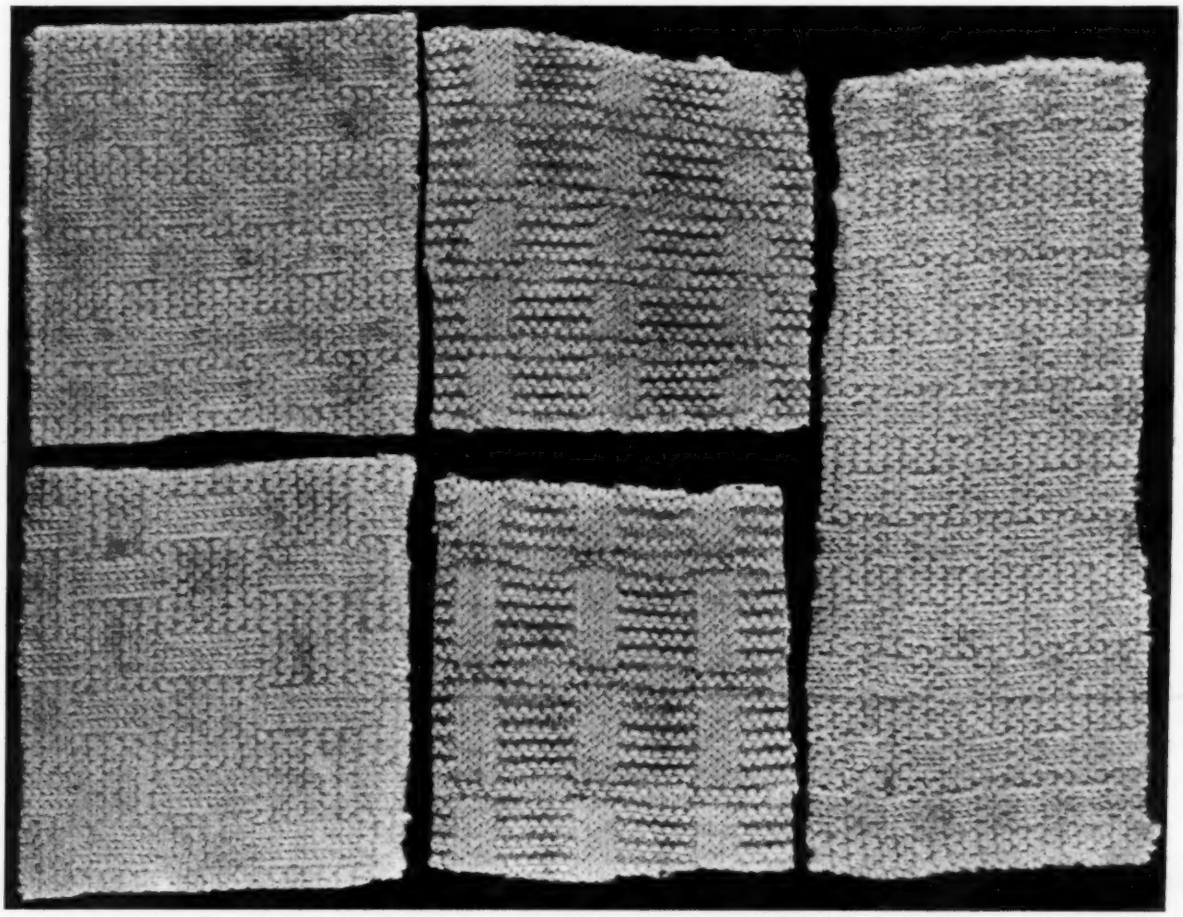
Pursuing this principle further, let us take a new arrangement of pattern sliders and set out the bed in 6 and 2 order. The simplest pattern is of course the stripe in 6 and 2, which should be for preference varied with alternate rows of plain stitch. In some cases where the stripe is a narrow one, the alternation is not so necessary, if a sharp stripe of limited size is required. A highly popular pattern is given in Design 6, where the shogging handle is brought into use every 6 courses and the 6 and 2 arrangement translated into a kind of basket effect, which is very neat and smart when displayed in a nice, clear ground color. Design 7 shows the shogging done in exactly the same manner as the last example, but for one course only every third. In Design 8 the intervals of shogging are greater, being 5 and 1. Design 9 gives a zig-zag effect produced by the same 6 and 2 arrangement of slides. The handle is altered every 2 courses for 6 times and then brought back again to start, thus producing a very effective waved effect in the cloth.

The remaining designs are all worked out on a similar principle. Number 10 shows a basket effect when the needles are set out with 9 plain sliders and 3 pattern ones. It will be noticed that all these basket designs have a kind of overlap. This will be made clear on examining Design 10, where threads 7, 8 and 9 are plain throughout the pattern. That portion corresponds to the part where the strands cross each other in intersection. In Designs 11, 12 and 13 the sliders are set out 1 and 3 and a variety of patterns produced, as before. The effectiveness of those designs depends to some extent on the size of the yarn used

and the gauge of the work. For the past two seasons there has been a great demand for knitted coats in very thick 3 and 4-ply yarns, where quite a small alteration of the stitch will give a handsome effect. At present the feeling is towards coats of a finer gauge in thinner yarns so that the patterns have to be somewhat larger to be effective.

There is always a demand for the hand-knitted article in the large distributing centers and the remaining patterns given refer more particularly to them. They are always produced in thick yarns to assure the production in a reasonable time. A certain section of the public have a prejudice against machine-made articles, as they have the impression that hand-made goods are of higher and more reliable quality. Such articles are generally more irregular in stitch, but their supporters claim that the natural qualities of the yarn are better preserved and that the stitches are more symmetrical. One point certainly in their favor is that they may be produced with greater elaboration of effect for the sides, pockets, neck, etc., where by hand an entirely different genre of stitch may be used for the edging with very good effect. The only other point of advantage is where a stitch is found which cannot be readily produced on the ordinary machine. Such a stitch was the well-known cable or rope pattern which captured the market a season ago. It was an imitation of the twists of a rope and the manufacturer found that it cost as much to make it on the machine as to have them knitted by hand so manifold were the changes required for the pattern. Designs 14, 15 and 16 give the patterns in demand for the present season for hand-knitted articles. Designs 14 and 16 have as their chief features a one and one alternate effect introduced in the form of a stripe. Design 15 is a box effect which has had a very extensive sale.

The growth of the use of knitted cloth for making into garments for the sporting trade is one of the most remarkable developments of this industry in recent years. Several factors contribute to this development. The yarns from which they are made is usually slack twisted and of a material which is soft and agreeable to handle. Then the elasticity peculiar to the knitted cloth more than any other gives free play to the movements of the limbs on the golf course or sporting ground. The other factor is the variety of fresh and original patterns which are possible and the small tackle required for their production. There is also the large assortment of bright and gay colors which the dyer has evolved. All these factors combine to produce that effect on the mind which scientists tell us is necessary for perfect health. To don such a garment makes one forget the somber and plainer garments necessary for work and induces the frame of mind which enables the game to be thoroughly enjoyed so that the exercise has its fully beneficial effect. One word to the manufacturer, and it is this: If the demand for those sporting goods has to persist and constitute a permanent feature of the knit goods industry, he must pay close attention to the subject of designing. Each season he should be able, with the aid of the clever machines at his service, to evolve new styles, new designs and new colors, which assist him to capture the market.



Fabrics from the Pearl Machine.

DYEING, BLEACHING AND FINISHING.

THE MANUFACTURE OF ARTIFICIAL SILK FROM COTTON.

(*Contributed Exclusively to* COTTON).

BY H. R. CARTER.

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CUPRAMMONIUM SOLUTION.

Schweitzer's reagent, or ammoniacal solution of cupric hydrate will dissolve most forms of cellulose. Cross & Bevan prepare this reagent as follows: Two grammes of copper sulphate are dissolved in 100 cubic centimeters of water. Hydrated copper oxide is precipitated from the cellulose by adding a slight excess of a 10 per cent solution of sodium hydroxide. They wash the precipitate entirely free from alkali, drain and mix with a 10 per cent solution of glycerol. This they preserve in stoppered bottles and when required for use, wash free from glycerol and dissolve in ammonia water of 20 per cent strength.

Bronnert, Femery & Urban prepare a Schweitzer's solution containing about 5 per cent of copper and a relatively small amount of ammonia, as follows: A cold solution of ammonia is poured over copper turnings in tall cylindrical vessels and the whole cooled down to 32 to 40 degrees F. by placing in a freezing mixture. Cold air is then blown through this mixture of copper and ammonia for about 10 hours. The solutions so obtained are only stable at low temperatures.

When metallic copper is moistened with or immersed in watery solutions of ammonia and exposed to the air, oxygen is gradually taken up by the copper from the air and the oxide of copper formed dissolves in the solution of ammonia, forming this blue liquid or cuprammonium reagent. Large quantities of this liquid may be prepared for manufacturing purposes, as follows:

Metallic copper, either in small lumps or in the condition of clippings or cuttings of sheet copper or copper filings, is covered with a solution of ammonia in water or with a weak solution of cuprammonium hydrate containing an amount of free ammonia in solution, depending upon the strength of the solution required. A current of air is then caused to pass through the whole by means of an air pump, fan or blower, in such a fashion that the bubbles of air pass over and among the portion of copper which may be advantageously kept in suspension by a mechanical agitator. In a few hours the liquid becomes saturated with as much copper as it can permanently dissolve, the rate of solution varying with the form of vessel, the strength of the ammoniacal fluid and the rate of the passage of the stream of air.

Another process of manufacturing the same reagent on a commercial scale consists in loosely piling metallic copper in lumps, etc., inside a vertical tube or tower, say, 12 feet high, and allowing water to trickle from a pipe or cistern over the copper so as to keep its surface moist. At the base of the tower a current of air with ammonia gas is caused to pass into the tower so as to ascend upwards, meeting the descending water as it trickles over the copper. Under these conditions the copper becomes oxidized and the water dissolves firstly the ammonia gas and then the oxide of copper which has been formed, so that the liquid which passes out at the base of the tower is a solution of cuprammonium hydrate, the strength of which depends upon the proportions existing between the bulk of the mass of copper, the quantity of water trickling over it, and the amount of air and ammonia gas supplied in a given time. The same result is arrived at, if instead of water, ammonia liquor be allowed to trickle over the copper.

Or, the reagent may be manufactured in the following way: Two vessels of equal size are filled with lumps, etc., of copper, loosely piled. One of them is filled with a watery solution of ammonia, this liquid is allowed to run by gravity or is pumped into the second vessel, so that the first vessel contains copper moistened with solution of ammonia together with the air which has run out. Under these circumstances, the surface of the copper is quickly oxidized so that when the solution of ammonia is allowed to run back into the first vessel from the second, and allowed to stand in it for a few minutes, it rapidly dissolves the film of oxidized copper. While this is going on the copper in the second vessel is being oxidized by the air admitted during the running back of the liquid into the first vessel, so that by alternately passing the liquid from one vessel into the other and back again after standing a few minutes, additional copper is continually oxidized in each vessel, when emptied of fluid and the oxidized copper so formed is continually more or less completely dissolved by the solution of ammonia when the fluid is readmitted. In this way after a sufficient number of passages of the liquid from one vessel to the other, a large quantity of copper is brought into solution. The use of agitators hastens the formation of the solution. Two or more of these commercial processes may be economically worked in conjunction. The solution should contain at least 15 grammes of copper per litre and ten times that amount of ammonia gas.

Dr. Bronnert, in getting ready his solvent in this way, pumped cold air at 30 pounds pressure per square inch through the liquid ammonia and copper turnings contained in a cylinder as described. Each cylinder is provided with an air meter, like a gas meter, to register the quantity of air passed through in a given time. The solution remains in the cylinder until it is of sufficient density, which degree is ascertained by means of areometer. A small quantity of the hydrate of copper dissolved in the ammonia being allowed to run into a test tube for the purpose of testing its density. While the hydrate of copper is being dissolved in the ammonia, the temperature of the cylinder is kept at about 40 degrees F. This temperature is controlled by a thermometer fixed on the cylinder and plunged into the solution. In order that the desired temperature may be maintained, the cylinder is jacketed and a circulation of cold water from a refrigerator kept up through the jacket, which is also covered with a non-conducting composition. A quart of lactic acid is also added per day and per cylinder to hasten the dissolution of the copper. It is only every ten days that the copper has to be replaced by fresh material. When the solution is sufficiently concentrated it is run off into a graduated reservoir, the cubic contents of which is known. In this reservoir the solvent is mixed with a quantity of water according to its strength. It is then

ready for use in the mixers. A good commercial result is obtained from 125 pounds of ammonia and 22 pounds of copper to each 100 gallons of solvent.

Instead of first preparing Schweitzer's reagent and then adding the cellulose in the mixer, cupro-ammoniacal solutions of cellulose may be prepared by first treating the cellulose (cotton), which has been thoroughly purified and pulped in the hollander as previously described for half an hour or more with a solution of caustic soda containing about 16 per cent of soda. Two molecula proportions of caustic soda are required for one molecula proportion of cellulose calculated as $C_6H_{10}O_5$. The mixture is then thoroughly stirred at a low temperature with finely powdered copper sulphate. The quantity of copper sulphate used should correspond with the quantity of caustic soda; that is, one molecula proportion of copper sulphate for two molecula proportions of caustic soda. The paste thus obtained dissolves easily in concentrated aqueous ammonia, giving a deep blue solution containing 7 to 8 per cent of cellulose.

This is only another method of getting at the same result as the previously described manufacture of ammoniacal solution of cupric hydrate, for the addition of caustic soda to a solution of copper sulphate produces a pale blue precipitate of cupric hydrate. Thus:

$$Cu\,S\,O_4 + 2\,N_a\,O\,H = Cu\,(O\,H)_2 + N_{a_2}\,S\,O_4.$$

The addition of ammonia to this precipitate produces the rich deep blue ammoniacal solution of copper hydrate.

Sulphate of copper or blue vitriol is the most important of the copper salts. It comes into commerce as large blue asymmetric (triclinic) crystals. It may be prepared by dissolving small scraps of copper in dilute sulphuric acid slightly warmed. On standing to cool, the crystals separate out or form in clusters around a piece of string suspended in the solution. The reaction which takes place is represented by the equation:

$$Cu + H_2\,S\,O_4 = Cu\,S\,O_4 + 2\,H.$$

On a commercial scale it is obtained by heating the copper in a furnace and throwing sulphur on the red hot metal. Air is admitted and the suhphide first formed is oxidized into sulphate which is dissolved in water and crystallized. It is also manufactured from sulphur ores of copper by roasting them under such conditions that the iron contained in them is changed into an oxide and the copper oxidized to sulphate.

Sulphate of copper is used in the preparation of the Theile silk in a manner analagous to that already described, the sulphate of copper, however, being first dissolved in warm water and when cold, beaten up with the pulped cotton into hollander. The subsequent addition of caustic soda produces the pale blue precipitate of cupric hydrate with which the pulped cotton or cellulose is intimately mixed. Ice is used, if necessary, to keep the temperature of the mixture below 40 degrees F. The proportions beaten up together are approximately 10 parts of cotton, 19 parts copper sulphate, 13 parts liquid caustic soda by weight of a strength 65 degrees Tw., and sufficient water to make it into a cream. The caustic soda should be let down with a like quantity of water before it is run in. 55 pounds of pulped cotton, 104½ pounds of sulphate of copper and nearly five gallons of liquid caustic soda will, with the subsequent additions of ammonia, etc., in the mixer, produce approximately 44 gallons of solution of cellulose.

The alkalinity of the precipitate of cupric hyrdate should be tested at this stage, a small quantity being treated in a test tube with an alcoholic solution of phenol phthalein. If the precipitate is alkaline it is turned pink. The precipitate together with the water in which it is suspended is next allowed to run by gravity from the hollander into the "monte-jus," from which it is afterwards forced by hydraulic pressure through a filter press, which removes the sulphur water and leaves the precipitate in light blue cakes of pulp. The thorough washing of the precipitate in the hollander is of the utmost importance, as the presence of Glauber's or other similar salts retard the solution. Solutions, therefore, obtained by decomposing the copper salts by an excess of ammonia are much less active than solutions of equivalent strength which contain only the hydroxide. An elevation of temperature also retards the activity of the solution.

The "monte-jus" referred to is merely a cylindrical wrought iron or steel vessel, usually egg shaped and provided with a man-hole door through which it is filled and by means of which it may be hermetically sealed. A pipe connection with the air pump or reservoir of compressed air makes it possible to force the contents of the "monte-jus" through a filter press, etc.

(*To Be Continued*).

NOTES ON DYEING, BLEACHING AND FINISHING.

THE NEWEST AND LATEST CHEMICAL FACTS FROM THE LABORATORIES OF THE WORLD. PREPARED FOR AND CONTRIBUTED EXCLUSIVELY TO "COTTON."

BY J. MERRITT MATTHEWS, PH. D.

The Use of Malt Enzymes in the Textile Industry.

The employment of malt enzymes in textile operations is becoming more common, and new companies for their manufacture are being organized in fresh fields. While malt has been used for a long while its employment was rendered less extensive because of the difficulty encountered in extracting the active constituents and eliminating the undesirable residuary matter. In 1903 the Diamalt Works in Vienna brought out a preparation of these enzymes in the form of a thick readily soluble liquid to which the trade name *"Diastofor"* was given. This material is advantageously employed with starch for stiffening; it gives a more adherent product and penetrates the fiber better. For this purpose a small quantity of a fatty material is advantageous and aids the bleaching of the goods. In silk skein dyeing it is employed in the lustering bath and increases the strength and elasticity of heavily weighted goods by 30 per cent. This result seems to be due to the absorption of the enzymes and of maltose by the silk. Important use is found for diastofor in the processes preliminary to bleaching; it reduces the time necessary for boiling, it attacks insoluble constituents and renders their elimination more easy, all of which reduction in time of action of the alkaline liquors is of decided advantage to the fiber. When complete bleaching is not demanded the goods after treatment with the diastofor, boiling-off bath and washing, may be at once dyed. For the degumming of dyed goods it is especially favorable, for these enzymes work at low temperatures and do not attack the color. For mercerization the alkaline baths remain pure longer if the goods have been prepared in baths containing these diastases. The most extensive employment of the material is, however, in

finishing as an addition to starch, giving an especial strength, luster and feel to the fabrics while allowing also of a higher charge and one more resistant to dampness.

Effect of Softeners on the Fading of Dyestuffs.

A series of very interesting experiments have recently been made on the action of certain cotton softeners as influencing the fading of colors when exposed to light. These tests have been carried out by J. R. Hannay using mercerized and unmercerized material dyed with equal weights in dark and light shades with the following series of dyestuffs:

1. Benzo Fast Red 8BL.
2. Thional Green 3B.
3. Mixture of Katigen Green 2G and Chloramine Yellow M.
4. Algol Blue 3G.
5. Indigo.

In the case of the mercerized material, a diminished quantity of the dyestuffs was employed so as to obtain the same shade as with the unmercerized material. The dyed cloth was then finished with solutions containing various softeners. The mercerized material on exposure to light was less affected than the unmercerized cotton, and the character of the fatty acid in the softener appeared to exercise a greater influence on the final result than the nature of the alkali with which it was combined. The influence of castor oil on the amount of fading was very marked, soluble oil (Turkey red oil) and monopole soap producing the maximum degree of fading, while a soda oleine softener produced the least. Rape and cocoanut oils also appear to be deleterious, and consequently should be avoided in the preparation of softeners. It is claimed that as far as its effect on the fastness of the color to light is concerned stearic acid is the ideal fatty matter to employ, but this, on the other hand, does not yield sufficient softness for most finishes. A mixture of ammonium stearate and Irish moss gives a very full and good finish. Olive, arachnis, and maize oils offer the most promising substitutes for castor oil, oilve oil being probably the best in this connection. The experiments also demonstrate the fact that the materials employed for filling do not apparently affect the fastness of the dyed color to light.

Action of Magnesium Chloride in Cotton Finishing.

Cotton goods are frequently finished with sizes containing magnesium chloride, which is added both to serve the purpose of a filler and as a hygroscopic substance to give a soft handle to the goods. It has been a matter of observation, however, that cotton goods finished with sizes containing this substance are often liable to the defect of becoming tender. The action of magnesium chloride in this connection is supposed to be due to the fact that this salt liberates a small amount of free hydrochloric acid under certain conditions, and this free acid brings about the tendering of the fiber. E. Ristenpart has made a number of experiments in order to determine just what conditions are necessary to cause the liberation of free hydrochloric acid from magnesium chloride. His conclusions are as follows:

(1) An aqueous solution of magnesium chloride does not undergo decomposition at temperatures below 220 degrees (F), even when heated in a current of air or of steam, or in the presence of cellulose or of any ordinary ingredient to be met with in the composition of a sizing paste.

(2) Even when magnesium chloride is heated to 450 degrees (F) the amount of free hydrochloric acid which is formed is only equal to about 2 per cent of the weight of the salt taken.

(3) The tendering of cotton goods which have been finished with a size containing magnesium chloride does not occur at temperatures below 220 degrees (F). In fact, such goods may be exposed to the action of saturated steam and undergo the process of decatising without injury.

(4) At higher temperatures than 200 degrees (F), especially if the exposure is long continued, the cotton will become tendered. In view of this fact, it may be stated that a temperature of 212 degrees (F) should be regarded as the highest temperature at which it may be dried with safety in practice.

(5) Beneath this maximum of temperature magnesium chloride may be employed with perfect safety; however, it must be borne in mind that such goods must not subsequently be subjected to a severe hot pressing or calendering, nor must they be exposed to the action of superheated steam.

Action of Perborate of Soda on Textile Fibres.

Perborate of soda is coming into considerable use in connection with soap powders as a detergent for use with textile fibers, consequently it becomes of interest to understand the action of this substance on these fibers. The washing powders of this character usually consist of a mixture of soap and sodium carbonate with about 10 per cent of sodium perborate. When a mixture of equal parts of soap and soda crystals is used, it is found that the average loss in strength of fabrics of different kinds after six washings, was as follows:

Linen	15 to 20%
Cotton	18 to 22%
Wool	15 to 20%

With a mixture of 45 per cent of soap, 45 per cent of soda crystals, and 10 per cent of sodium perborate, the corresponding figures were:

Linen	21 to 39%
Cotton	29 to 43%
Wool	24 to 100%

In the last instance with wool, the complete destruction represented the effect on fine materials. Very thin materials, such as fine muslin and lace are also practically completely destroyed, and mercerized cotton is also very much deteriorated. These tests were carried out by E. Luksch, of the Textile School at Vienna, and consequently carry with them considerable authority.

Absorption of Tannin by Cotton.

The results of some experiments relating to the reaction of cotton with tannin solutions has been published by A. Sannin. In these experiments 4.2 grams of "air-dried" cotton were immersed in 500 c.c. of a tannin solution, the concentration of which varied in the different tests from 5 per cent to 0.1 per cent. After steeping in these solutions for 45 hours, the cotton was removed, and the amount of tannin remaining in the solution was determined by analysis. This analysis was conducted by precipitating the tannin as the antimony compound by the addition of a reagent containing a sodium chloride, tartar emetic, sodium acetate, and acid sodium tartrate. The results obtained did not seem to be in accordance with the formula which has been proposed by von Georgevics, but it appeared to agree satisfactorily with the following absorption formula:

$$x/m = B c i/p$$

where x/m is the quantity of tannin absorbed by one gram

of cotton, c is the concentration of the tannin solution after absorption, and b and i/p are constants. In similar experiments with an alkaline solution of tannin (a solution containing 22.4 grams of tannin and 2 grams of sodium hydroxide in 2 liters of water, diluted to different degrees), no absorption of the tannin by the cotton took place. In a third series of experiments, the effect of hydrochloric acid, (about 10 per cent of the weight of the tannin), was studied, and it was found that from the weakest tannin solution (0.2 per cent of tannin) more tannin was absorbed by the cotton in the presence than in the absence of hydrochloric acid; but in the stronger solutions (0.4 to 1 per cent of tannin) the reverse was the case. The actual concentration of the acid in the tannin solution (from 10 to 70 c.c. of normal acid in 500 c.c. of a one per cent tannin solution) had no appreciable influence on the amount of tannin absorbed by the cotton.

Influence of Structure of the Cotton Fibre on the Dyeing Process.

An investigation dealing particularly with the influence of the structure of the cotton fiber on the process of dyeing has been recently carried out by R. Haller. Microscopical and optical examinations of dyeings were made obtained by (a) topping Chrome Yellow with indigo and *vice versa;* (b) topping Para red with indigo and *vice versa;* (c) topping Manganese bistre with indigo and *vice versa;* and (d) dyeing Alizarin blue on a tannin-chrome mordant. The following conclusions were deducted: (1) The dyeing of cotton is not due to the filling up of the pores in the cell wall by the dyestuff, since cotton which has been loaded with one substance to an extent which would fill up any pores can still take up further quantities of other substances. (2) The central canal in the fiber does not play any direct part in the dyeing process by giving rise to capillary effects, since the seed hairs which have not been removed from the seed are dyed in an exactly similar manner as loose fibers, and since in the former both ends of the fiber are closed the central canal is not free to exert any influence. (3) There is no essential distinction between the fixation of pigment and mordant dyestuffs. Any differences may be ascribed to differences in the physical condition of the precipitated pigment. (4) The phenomena of indigo are thus explained: During the first passage of the material through the vat, the fiber acts as the absorbing medium and particles of indigo white are deposited in and on the cell membrane and are oxidized to indigo during the exposure of the dyed material to the air. During the second and subsequent passages, however, the fiber acts less and less and the absorbed indigo more and more as the absorbing medium. Furthermore, the already absorbed indigo prevents the newly absorbed particles from entering the cell membrane, and they are therefore deposited on the outer wall of the fiber. Hence the cross-section of a strongly dyed fiber will show the interior to be stained only a light blue color. The dyeing of mordant dyestuffs is similarly explained. (5) Haller is inclined to accept the "micellar" theory of Nageli as an explanation of the dyeing process. According to this theory the ultimate cells (micells) of the fiber without altering their relative positions, can draw into the spaces between them molecules of substances for which they have an affinity. In support of this theory Haller brings forward the fact that if a fiber dyed with para red and topped with indigo is treated with an ammoniacal solution of copper oxide (Schweitzer's reagent), in order to cause it to swell and become transparent, the mixture of the different colored particles gives a green effect in dispersed light. (6) From the fact that many pigment dyed fibers were evenly dyed throughout, Haller comes to the conclusion that the fixation of dyestuffs by developing them on the fiber is based on the same reactions as the dyeing of cotton with substantive dyestuffs.

PRINTING SULPHUR DYES.

BY CAMILLE FAVRE, BEFORE THE SOCIETE INDUSTRIELLE MULHOUSE.

Sulphide of sodium solution gives a white precipitate with formaldehyde, gradually in the cold, rapidly if the solution is hot. The presence of glucose prevents the precipitation. It is very easy to dissolve sulphur dyes in a mixture of glucose, sodium sulphide, water and gum by adding carbonate of potash or soda, and some formaldehyde in the cold. After the mixture has stood about ten hours, a printing color is obtained which does not attack and gives, after two minutes' steaming in the Mather and Platt, shades as bright as those obtained by the caustic soda process. An addition of sulfoxylate will darken the shade a little, but it is not indispensable.

The general formula is as follows.

1 pound dye.
2 pounds 1 ounce sodium sulphide.
½ pint glucose.
½ pint water.
½ pint gum.
3 pounds 5 ounces anhydrous potash.

These are dissolved by being boiled together. Then at 122 degrees F., 7 ounces of Rongalite are added, and when the whole is cold, ½ pint of 40 per cent formaldehyde.

DILUTENT

¼ pint solution SFB.
1 quart gum.
3 pounds 5 ounces anhydrous potash.

SOLUTION SFB.

1 pound 10 ounces sodium sulphide.
½ pint water.
½ pint glucose.
½ pint cold formaldehyde.

Battegay's report on this process notes that sulphide of sodium gives with formaldehyde a stable compound in which the sulphur is chemically inert is noticed in DRP 164,506 (Cassella), Cassella & Co., also took out DRP 168,598. The use of this compound in printing sulphur dyes takes advantage of the circumstance that the sodium sulphide recovers its activity on steaming, especially in the presence of bisulphite. M. Favre's invention, however, deals with printing with sulphide printing colors, which do not attack the rollers and are free from caustic alkali. He arrives at his results by preventing the action of the sodium sulphide previous to the steaming, partly with formaldehyde, but also by the addition of glucose, which keeps the sulphur dye in solution. M. Battegay's results confirm those of M. Favre. If no glucose is used, the dye is precipitated with consequent loss of depth of shade.

Inquiries about anything pertaining to the textile industries will be cheerfully answered by COTTON.

Practical Problems Discussed by Cotton's Readers

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so indorsed. This department is open to all.

BALANCING THE TWIST IN CABLED YARN.

EDITOR COTTON:

I have been very much interested in the series of letters and discussions on balance twist that have been appearing in the Practical Discussion department of COTTON for the last several issues. I have hesitated about taking any part in this discussion, but your contributors are missing just the point of the question I desire to see explained. While I am thoroughly interested in the whole subject, I should like, also, to know more about the principles of cable twist, and so I am writing to ask if you know where I can get any information on this subject.

For example, say I have a 12's yarn with 13 turns of twist in the single, and receive an order for a cable yarn about number ½. I decide to twist the 12's single 4-ply, as I have a little 4-ply 12's already twisted. This will make a No. 3 yarn in the ply. I must, therefore, cable this No. 3 yarn into a 6-ply in order to get my ½ cabled yarn. What I want to know is this: (1), what is the best number of turns to put into the single yarn (right hand twist); (2), what is the best number of turns to put into the ply yarn (left hand twist); and, (3), what is the best number of turns to put into the cabled yarn (right hand twist) to get a smooth, nice, cabled yarn that will not kink, but will hang dead, having what I call balanced twist in the cable?

I should appreciate any hints from your readers, but I desire to say that this one individual problem does not interest me nearly so much as the finding out of the general underlying principle of cabled yarns, so that I can solve other and similar questions to the above.

"Lowell" (Massachusetts).

FIGURING AVERAGE NUMBERS IN THE SPINNING ROOM.

EDITOR COTTON:

In the June issue of COTTON, "Y. L. Y." gives us a very interesting article in figuring in the spinning room, but one that should not pass without criticism. I do not agree with him on his method of figuring average numbers and will try to show the readers of this department wherein lies his mistake. "Y. L. Y." bases his figures on the number of spindles producing the different sizes of yarn instead of figuring the actual amount of yarn produced of the different sizes and using this as a basis for his calculations. The trouble in using the method he advocates is the fact that it does not take into consideration the amount of each spindle production.

It is conclusive that the spindles on the coarser numbers will turn out more yarn than those on the fine numbers, hence basing the calculation on the number of spindles is wrong Now if the spindles actually produced the same amount on fine as on coarse numbers, then the basis of the calculation would be correct. But this condition is never present and in figuring average numbers we are compelled, if we wish to be accurate, to base the calculation on the amount of yarn of the different sizes spun.

Taking the problem he uses and assuming it to be all warp yarn with standard warp twist, the 10's and 12's to be spun with a spindle speed of 8,700 r.p.m., 15's with a spindle speed of 9,200 r.p.m., and 20's with a spindle speed of 9,400 r.p.m. I have selected the above spindle speeds to illustrate the problem with no idea of what spindle speed he was using.

Figuring the production for one spindle, for a 60-hour week, allowing for 10 per cent loss of time, will give the following: 6.19 pounds per spindle on 10's; 4.71 pounds per spindle on 12's; 3.23 pounds per spindle on 15's; and 2.37 pounds per spindle on 20's.

The production of the different counts of yarn based on the number of spindles given by "Y. L. Y.," with the corresponding number of hanks and the total number of pounds and hanks produced will be found as follows:

10's 1400 × 6.19 = 8666 lbs. = 86,660 hanks
12's 1000 × 4.71 = 4710 lbs. = 44,520 hanks
15's 1500 × 3.23 = 4845 lbs. = 72,675 hanks
20's 2100 × 2.37 = 4977 lbs. = 99,540 hanks

Total 23198 303,395

Rule for finding the average number spun: Divide the total number of hanks produced by the total number of pounds produced. Then: 303,395 ÷ 23,198 = 13.07 counts as the average number spun.

This calculation bases the result on the total number of pounds produced and the total number of hanks produced. The figures show, under the conditions stated, a production of 23,198 pounds of yarn, which contains 303,395 hanks and the average number must be 13.07 as shown.

The large production of 10's yarn is what brings the average down so low. The spindle speeds I used are assumed, of course, but serve to illustrate the point just as well as if they were the ones actually used. If the spindle speed on 10's, for instance, was lower than what I used, the production on that number would be less and it would have its effect on the average number, while by the method used by "Y. L. Y." this would not be seen in his average number and, no matter how much variation there might be in spindle speed, front roll speed or production on the different numbers run, his average number would remain the same.

Another point on which I wish to differ with "Y. L. Y." is his method of getting the average roll speed and figuring the production of the room from that and his average number. He says: "The method usually adopted is to get a speed indicator and take the speed of the front roll on each machine, then add the different speeds and divide the sum by the number of frames in the room."

This method might be all right, provided all the frames in the room had the same number of spindles, but in the

case in question there are frames of 204, 224, 232 and 256 spindles each. It is evident with this variation a simple average of the front roll speeds of the different frames will not serve to give us any accurate results. It might be that most of the high speeds noted were on the frames with the largest number of spindles, turning a greater quantity of yarn than if the reverse were the case and yet the room production, according to this method, would remain the same. Hence we cannot arrive at our room production by any such method where the frames are of different length. The best method, and the most accurate, is to figure the room production from the number of spindles on each count and the speed of the spindles, then add the figures together for the total.

"Y. L. Y." uses a production constant of 374. There is some mistake here of decimals, for this constant should have been .374. This will make his production multiple .0356 instead of 3.56. Then $.0356 \times 150 = 5.34$, which is the answer he gets.

This letter is not written simply in a spirit of criticism, but to correct a wrong impression for the benefit of all concerned. B. M. P. (North Carolina).

A QUESTION ABOUT CARDING.

EDITOR COTTON:

The distance between the bite of the feed roll and the lower edge of the face of the feed plate should be from 1/16 to 1/8 inch longer than the average length of the cotton being worked, as it is necessary that the fibers should be free from the bite of the feed roll before the action of the teeth of the licker exerts its greatest pull, which is at the lower edge of the plate, otherwise, the fibers would be broken.

With the above in mind, measure the distance from the heel of one flat to the heel of the next flat, and in most cases you will find it to be 1½ inches. Therefore, when we run cotton longer than 1½ inches the fibers are gripped by the heel of both flats at the same time, and if the wire on the proceeding flat is sharper than the wire on the preceding one, the cylinder wire will either break or roll the fibers. Does this take place on our latest revolving flat cards? Is this the cause of yarn made from revolving flat cards being weaker than that made on the old stationary flat card? This has troubled the writer, and the speed combined with the above distance between the flats is the only reasons he could advance for the yarn being weaker from the revolving flat cards.

Some readers may state that the stationary flat cards removed much more strips which was an advantage, but I have made a test with the same percentage of waste on each card, with the same cotton and the same weight sliver, and in each case the yarn from the stationary flat card broke from three to five pounds better than the yarn from the revolving flat card.

I think the above point a good one for consideration and for the builders to solve. As you no doubt know, the distance between the heel of one flat to the heel of the next flat on the stationary flat card is greater than the length of any staple.

I would like to see this question discussed at length in this department of COTTON, as I am one, at least, who is looking for light on this subject. "Wash" (New York).

FURTHER CONSIDERATIONS IN THE BALANCE TWIST PROBLEM.

EDITOR COTTON:—

At the request of different correspondents in your practical problem department, I am again writing about balance twist yarns.

In the April issue "H. X. S." gives twist multiples for balance twist sewing twine, in which the ply yarn multiple is about 32 per cent less than the single yarn multiple.

In the May issue, "H. E. W." shows that 25 per cent is his multiple, and that my multiples for the two examples given are 30 per cent and 35 per cent.

In the June number, X. Y. Z. A. explains further his method of getting "dead" or "balance" twist, in which his multiple is 20 per cent.

It seems logical that each man should have a different multiple, because local conditions are always so different. I find, however, that one multiple will not hold for my range of yarns, which are as coarse as 16's 16-ply on the one hand, and as fine as 60's 2-ply on the other hand. I find that the correspondents who are sending discussions on this question to COTTON, all seem to agree, within reasonable limits, as to the amounts of twist to put into the single and ply yarns to get a balance twist, but it seems to me that as the plied yarn gets finer that the percentage of difference between the twist multiples lessens and finally the multiple of the ply yarn is actually greater than that of the single yarn.

For example, the 60's yarn 2-ply which with about 34 turns in the single is balanced with about 31½ turns in the ply as follows:

$$\sqrt{60} = \frac{34}{7.7460} = 4.38 \text{ single multiplier.}$$

$$\sqrt{30} = \frac{31.5}{5.4772} = 5.75 \text{ ply multiplier} = 30 \text{ per cent more plus or minus.}$$

For 40's yarn, 2-ply, the difference is also about 30 per cent more for the ply multiplier.

For 24's yarn, 3-ply, the difference is about 18 per cent less for the ply multiplier.

For 23's yarn, 11-ply, the difference is about 30 per cent less twist factor for the twisted yarn than the single yarn, as H. E. W. states in the May issue.

It can be easily seen from this, and it seems impossible to me, to use one figure to represent the difference between the two twist multiples.

I should feel greatly indebted to "H. X. S.," "X. Y. Z. A.," and "H. E. W." if they would tell me, through the Editor of COTTON, the range of yarns and twists that they find do work out correctly by their methods, as when we get it all grouped together we may all learn something to our mutual advantage.

At present I do not think there is any hard and fast rule, or even an approximate rule, that will cover my range of yarns.

"H. E. W." asks me how I figure twists also, and I would reply as follows: In finding the single yarn twist I first do it by figuring the gears, using a twist constant in the usual way and then I check this theoretical answer by

running one end of white and one end of black roving on my spinning frame. In finding the ply twist, I pull the yarn from the side of the spool and count the twist on a regular 10-inch twist counter. W. C. (Massachusetts).

WHY THE BOBBIN LEAD FRAME WAS ADOPTED.

EDITOR COTTON:

"Wash," in the June issue of your paper, asks several questions, one of which I will try to answer, *viz.*, "Why was the bobbin lead frame adopted?"

The reasons I have always heard given for the adoption of this type of drive were about the same and seemed to leave something to be added.

As all the power utilized to give the bobbins the necessary excess speed is transmitted through the cone-belt it naturally follows that there is considerable strain put on it. In the case of the flyer lead frame, the bobbins increased in speed as they grew larger and heavier and, consequently, this threw more strain on the belt. The belt was then more liable to slip and cause trouble. In the case of the bobbin lead frame, the speed of the bobbins was decreased as they grew larger, and hence the extra strain necessary to drive them faster the heavier they got was not present, and there was not present the same tendency for the belt to slip.

As "Wash" seems to think there is not much weight to this reason, I do not suppose he will think it worth considering. However, it stands to reason that it requires a great deal less power to drive the bobbins slow when they are full of roving, as is the case with the bobbin lead frame, than it does to drive them fast, as is the case in the flyer lead frame.

In the old style flyer lead frames, the flyer was driven positively by gears and at a constant speed. The spindles carried the bobbins and were raised and lowered to give the lay of the roving on the bobbin. The spindle speed was variable, being greatest when the bobbin was full. Any slippage of the cone belt would cause a variation in the bobbin speed and there was a great deal more chance for slippage to occur at the belt and vary the speed of the bobbins than there was of the flyers varying in speed. If there was any hesitancy in the starting of the bobbins, the flyer would go ahead and stretch the roving between the bobbin and presser foot. There was more chance of the bobbin shipping than there was of the flyer.

In the case of the bobbin lead frames, if the cone belt slipped and the bobbins did not start promptly, the roving would become slack and no serious damage would be done.

These reasons are given as being the ones that led to the discarding of the old flyer lead frame and the substitution of the bobbin lead frame; if they are not correct, I would be glad if "Wash" will let us hear from him.

Another reason for the change is in the fact that the bobbin lead frame is capable of higher production. The spindle is held stationary, supported in two bearings and driven at a constant speed by a gear drive. It is capable of going at a higher speed than the older type.

It was found almost impossible to construct a fly frame of the old type with a double row of flyers on the same side as was done with the modern type of frame.

There is one advantage the fly frame of today, which the bobbin lead, has over the older type, with the flyer lead, that may not have had anything to do with its adoption, but nevertheless, is present, and that is the waste made when an end runs out or breaks. On the old type whenever an end broke the bobbin would commence to unwrap itself and, if the girl was creeling at the back and did not notice it for a few seconds, considerable waste was made, for all the loose roving would be usually pulled off, besides that which had already unwound and beat itself into fly. This is a matter of small consideration for each time, but looked at from the standpoint of a room full of such frames it can easily be seen that it will amount to quite a lot.

However, in justice to the flyer lead frame, a lower class of waste can be successfully run with them and get as much or more production than on the bobbin lead frames.

"Bart" (North Carolina).

USEFUL KNOWLEDGE.

EDITOR COTTON:

How many of us are there who get the full value out of our trade journals? Some of us, of course, get more or less than others, but that a majority of us get only a part of the value to be gained, there can be no doubt. For instance, suppose most readers of COTTON do about as I do. When the journal arrives it comes to my desk first, that is, it is placed there by the mail clerk. After I have answered all letters I open the journal and the first thing turned to, naturally, is the editorials, then the general articles, practical problems and market reviews. If there is anything in the reading matter of the paper that is especially interesting it is read very carefully and probably laid aside to be read again. The advertising pages get a glance surely, and if I am not very busy I may even look through all of them.

How many times have I, however, when I needed something, remembered that I saw an ad. of that kind in COTTON, but did not remember which month's issue it was in. Or remembered reading of how some certain thing was done elsewhere and remembered most of the details, but had forgotten some small items that did not seem important at the time. As I could not locate the issue it was necessary to write a letter to the editor and presume upon his good nature to give me the date of issue containing the article or ad. to which I have reference and in nine cases out of ten send me a copy of the paper of that issue. This means one week's delay, if nothing more, besides putting the publishers to trouble, which, considering what my subscription costs is as near an imposition as anything can be.

A short time ago I had the good fortune to see a system worked out along this line that looked good to me although some of the details might be changed to suit individual conditions. It was in use in a factory that has a reputation for efficiency and shows one of the small items that so many of us do not consider worth thinking of, but which may really be of untold value.

One subscription is in the factory's name, regardless of how many of the bosses or executives may be subscribers. When the journal for the factory arrives it goes to a clerk who makes out a card for a card index box kept for that purpose. This box is indexed for nine departments, which is the number of departments in the plant. The name of each article of interest to that plant is entered on a card, which also contains brief comments on same and is placed in the box under the department to which it is applicable.

Consequently if some new system is needed or a new machine is wanted six months later it is an easy matter to refer to the box and find when and where it was mentioned. The cards read like this:

Publication .....
Date .....
Page .....
Subject .....

All copies of each journal are then filed in rotation so they can be secured whenever needed.

Each executive in charge of a department has a small index box for his own use so that if he sees something that interests him particularly at any time, he can make a note of it in the same way on such cards and have it in his desk for future reference, as he knows the journals are so filed in the office that he can get to see them at any time. The office cards are kept for 18 months before being destroyed.

The beauty of the thing is its nominal expense. If a $15 a week clerk makes the record it only takes about $3.00 worth of his time for a year's records for a journal like COTTON. The printing of the cards and all other expenses of the system are so little and the convenience and value so great that it pays for itself many times over each year. It certainly sounds good to me. W. J. B. (Ohio).

IS HE KNOCKING?

EDITOR COTTON:

Why is it that so many mills in the south are not in first class running condition? We find a great many mills that have some departments or the whole plant badly out of order. The causes are various.

A lot of these plants are in bad condition because of the incompetency of the superintendent. One that looks wise, but does not know his business. One that does not know how to select his overseers, and can't tell when he has a good one until his work shows up. Such a man can't go through the different rooms and tell the general conditions whether they are well or badly managed, for he doesn't know right from wrong when he sees it, unless it is a great big something.

We will take in this instance the weaving department. Go into a lot of weave rooms and one will find the machinery out of fix. Looms stopped for weavers. The loom fixers sitting on their work benches or standing around talking. The work is running bad. Everybody is dissatisfied from the overseer down. The production is low. The per cent of seconds is high. The superintendent gets scared and gets another overseer, (for as little pay as possible, of course). He will do this two or three times. In this way he can hold his job a while, but finally the "higher-ups" decide to change superintendents, and a lot of times it is the same old story over again, as they (the "higher-ups") usually look for a man with a long string of references. I wouldn't give a "whoop" for a man with a pocket full of reference letters, for they are generally given him through courtesy, and not because he is deserving of them through his competency. It is safe to bet your "bottom dollar" that he has been changing all his life, and can put up a line of talk that would make one think he was the greatest mill man the country ever produced.

I think that one great failing with the superintendents and overseers, or a great many of them, there are, of course, a lot of exceptions, is that they get perfect too quick and never try to learn anything more. In other words, they become conceited and settled in the idea that they are "it," that no one can teach them anything. I think some of them listen to other people's ideas with small contempt, and occasionally pity them a little because the ideas are different from those of the listener. One thing they do get perfect in and that is the line of looking and talking wise.

If these men would study the nature of the cotton mill operatives, the machinery and the difficult processes of the mill, and then try to improve and increase their practical and technical knowledge, instead of becoming self-conceited and perfect, more mills would be making money. The machinery would last longer. The supply bills would be less. The production greater. The quality better. They would get fewer kicks from the selling house. All these things will eventually work out, but in the meantime there is a lot of good money being wasted on experiments.

E. M. H. (South Carolina).

STANDARD TERMS VS. CUSTOM.

EDITOR COTTON:

In your May issue I note that "Wash" has unburdened himself considerably in regard to standard terms and what constitutes standard terms. After reading the article I fail to see that any light has been thrown on the subject beyond what has already been said. The largest part of the article is devoted to a discussion of "Nasmith's Students' Cotton Spinning," a book, by the way, that is well worth reading by anyone directly connected with the manufacturing end of the business. This criticism shows that the author, in getting out a book of 636 pages, made an error. Now, candidly, if he did not make but one, and "Wash" seems to know and points out only one, I am compelled to give him credit for doing a pretty good job.

"Wash" uses this citation as a hit at me for "consulting so many books." If reading books does not make one broadminded and teach him something, though there may be errors occasionally, then you have certainly got to give many of us credit for living a good while in this world laboring under a wrong impression. I have always found books beneficial, helpful and improving, and there are quite a few of the same opinion. I don't think you can read too many.

The fact that this error, if it can be called such, when read in connection with the whole subject under discussion, does occur in the book mentioned, does not tell "H. E. W." or myself whether either of us is right or not and does not in the least aid in making "Wash's" position reasonable. Even in his criticism "Wash" has not done himself justice, for he has gone about his calculation in a round about way, using too many figures to get his results. There is no need of going to the trouble of doing a lot of figuring that is hard to see into when a few figures will give the same result and make the method clearer. However, this is not exactly what I intended to write.

In selecting the terms I did, it was only with the sole idea of being understood by the majority of readers. I used the word "factor" with a certain definite meaning attached to it. If the use of the word had been wrong, something would have been said about it before "H. E. W." came out with his criticism, as the articles had been running in COTTON for over a year and the word had been in print

many times. The readers of the articles, and I have reason to believe they were many, seemed to understand the use of the term, and were not in the dark as to my meaning. However, the word "constant" is more generally used by writers, is really a better term for the purpose, and I said so. Still, and my contention is true, the word "factor" is largely used to convey the same meaning as the word "constant," and is so understood by the majority of people that I have talked with.

Now, in using the word "multiplier," or "multiple," I gave preference to the first word. I did so as it is used more largely by those that ought to know, than any other word or combination of words that can be mentioned. If you want a "reason" for the use of the word "multiplier," it will be found in the following statement: The square of the yarn is always multiplied by a certain number to get the twist per inch. This, of course, does not apply where we use a table to find the twist per inch or where it is figured from the gearing. This certainly seems to me a very good reason for calling the number used a "multiplier." It is certainly better, to my way of thinking, than any other term that can be put forward calling it anything else and the use of the term is proof positive of not getting it mistaken for some other.

Just a word or two for those of us who like to have a lot of "reason" behind every term we adopt and do not want to adopt or countenance the use of any except those that happen to comply with our own particular line of reasoning. The following is to show that we can't say that the use of any word or term is wrong simply because it has no "reason" for its use.

Take the roving can, for instance: Is there any "reason" attached to its name? Do we use it for holding roving? Ought we not to call it a "sliver" can? But how many of us would rise up and say that a writer was wrong for using the term? The only "reason" I have ever found for the use of this and many other words is simply because general usage has made it correct.

But "Wash" has sprung a new one. "However, it will be remembered that on the Old Lowell Fly Frames, that the twist constant was .0311 factor." This is certainly a nice mouthful to have to handle very often. The "twist constant" is a "factor," then naturally the "twist factor" must be a constant," and if a "constant" is a "factor" and a "factor" is a "constant," then, for goodness' sake, tell me where "Wash" has gotten to, except back to my original statement; "The words 'factor' and 'constant' are the same, being used to convey the same meaning, and the use of either is generally understood." Why not be sensible and let the generally accepted term be used and serve its purpose, and not be so bent on looking for some "reason?"

If we follow the arithmetical line of reasoning that both "Wash" and "H. E. W." seem inclined to do, and lay so much stress on, we could call all our "constants," or whatever terms that might suit us best, "quotients." This may sound absurd and, of course, is; but, by following the usage as laid down in all arithmetics that I have ever had the misfortune and worry of getting acquainted with during my experience as a school boy and since, it will be correct. In getting a "constant" we multiply a certain set of figures together for a "dividend," and a certain other set together for a "divisor," and the result of the final operation of division is a "quotient." Now, why not call it such? General usage, coupled with custom, has said not—and that is all there is to it.

Of course, there is "reason" for the word "constant"—and good reason, too—but, as shown, there is also "reason" for "quotient."

Why was a skewer ever called a "skewer?" Wouldn't "bobbin-stick" or "bobbin-holder" have been better if we want a "reason" for naming it?

Why do we call the needle section of a comber cylinder a "half-lap?"

The slubber is a roving or fly-frame. Why should it be called a "slubber," instead of "first" or "breaker" fly frame? The word "slubber" conveys no meaning to a person unless he already knows what you are talking about and knows the meaning attached to the word, whereas, the "first fly frame" would have a more definite meaning; in other words, there is a "reason" behind them.

Why are the fly frames so often called "speeders?"

When using four processes of fly frames in making fine roving for high counts of yarn, why is the last fly frame called a "jack?" Is there any particular "reason" for its selection, except to give it a name?

Why is roving called "roving?" Who ever stops to hunt for the "reason" for the use of such and many other terms in our work, or any other line of work, for that matter? I could go on for a page or two giving similar instances, but of course it is not necessary. I simply mention a few to show that we cannot always look for a "reason" for every name or phrase we use with any certainty of finding it, or, even after we find it, be sure it will turn out satisfactory.

In many cases the general usage or custom has adopted a term or phrase to convey a certain meaning that carries some direct connecting thought with it, but in many, many others, the name that an object goes by, or the term we use to convey a certain idea, does not convey any connection whatever to our mind, but we cannot say it is necessarily wrong because of lack of a "reason" behind it.

Away back in the dark past some one said that two and two made four, and we, all of us, today accept it as a fact, but not one of us can prove it. Why did it happen that two and two made four? Why should it not have been five, or any other number? Some of you might say that this is foolish, but stop and try to reason out why two and two make four, and to save your souls you can't get any further than to say that it is an accepted fact.

I think this explains my position in regard to the use of terms and what constitutes standard terms, etc., and I don't see that there is any need of my trying further to make it any clearer. B. M. P. (North Carolina).

ANOTHER QUESTION FOR GENERAL DISCUSSION.

EDITOR COTTON:

I have been deeply interested in the various discussions appearing in your practical discussion department. While some of these are not entirely accurate, as, for example, the letter of "Y. L. Y." entitled "Some Spinning Calculations" in the June issue, there are others that are very interesting and instructive. I may think it worth while a little later to take up some of the more distinct errors in "Y. L. Y.'s" letter and reply to same. Such careless remarks as these should not be permitted to pass unquestioned and I am sure that other interested readers of this department will also have something to say in this connection.

I desire to ask a question myself at this time and I

C. E. RILEY, Pres.
Boston Office
65 Franklin Street

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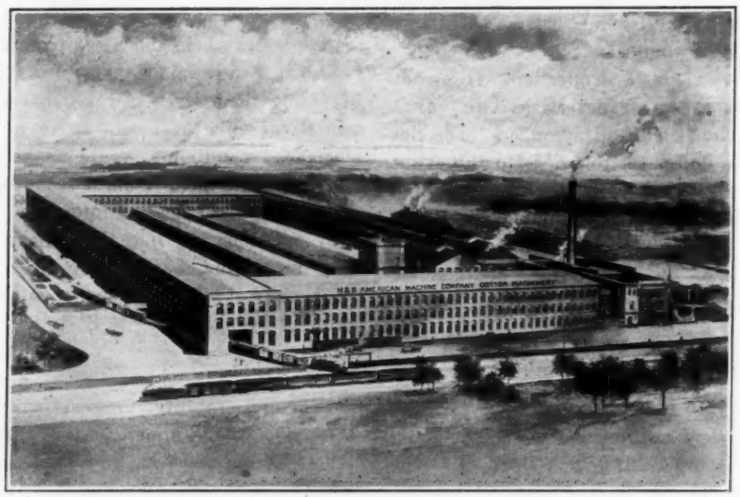
814-815 Empire Bldg.,
Atlanta, Ga.

COTTON MACHINERY

Opening and Picking Machinery

Card Room Machinery



Spinning Room Machinery

Twisters for Wet or Dry Work

With Band or Tape Drive

H. & B. AMERICAN MACHINE COMPANY
PAWTUCKET, R. I.

would like to have as many answers submitted as possible with the one proviso that all answers be from actual experience and not from book knowledge. The question is, which is the most trouble in a cotton mill, the weather, the cotton or the condition of the mill?

X. Y. Z. A. (Michigan).

ANSWERS NEW SUBSCRIBER.

(1) How can I keep the flats of my cards clean?

You have no doubt in your room burnishing rolls, but they are on the rack instead of in use. Take one of these rolls and remove the fillet, then rewind the fillet so the coils will be at least three inches apart instead of having each coil touch one another as before removing. Change the pulley on the flat cleaning brush to the driving side of the card. Have the pulley on the roll covered with burnishing fillet coils on the driving side of the card also. Set the burnishing wire so that the ends will just touch with the foundation. Drive this roll in the same direction as the grinding roll and drive the flat cleaning brush opposite to its regular direction. This is done by arranging a band long enough to circle the pulleys on the flat cleaning brush, the pulleys on the roll in question and the grooved pulley cast with the driven pulley on the card.

If the flats have been charged with stock for a long time it may be necessary to change the surface velocity of both rolls so as to loosen the matter in the wires. This is done by crossing the band at the flat cleaning brush pulley. However, to begin with, first cross the band on the pulley of the roll in question so as to give the surface velocity stated above.

(2) Why are fly frames of some makes weighted lighter than others?

Roll weighting is governed by the number of fibers in the cross section of the strand under action of the weighted roll. For this reason, it is necessary to weight the slubber heavier than the intermediate; the fine frame lighter than the intermediate; and the jack still lighter than the fine frame.

I will try and treat on this subject more fully later and with the approval of the editor of Cotton explain the difference between rolls weighted by weights and self weighting and their advantages.

(3) How could you set the top rolls on the slubber, intermediate, fly frame and ring frame, running the following hanks and yarn: 1.00 hank on the slubber, 3 hank on the intermediate, 7 hank on the fly frame and 40's yarn on the ring frame? I am using 1¼ inch stock and over.

It all depends on the nature of the stock and not on the hank roving. Rapidly revolving rolls require wider settings than those having slow speed, and although the hank roving does not govern the distance between the rolls owing to the nature of the stock, still, it should be understood that a bulky strand of roving requires wider settings than a light one, the draft also should be considered.

I would personally advise to first try ⅛ of an inch longer space than the average length of the staple between the first and second rolls on the slubber; 3/32 longer than the average length of the staple on the intermediate; and 1/16 on the fine speeder. Size the roving after setting and if the strand proves heavier than the figured draft indicates, this will prove that the rolls are too close and causing too

much frictional contact between the front top leather and bottom steel rolls.

(4) To find or trace the defects in yarn or cloth requires a goodly grain of experience and ingenuity. The best way is to pull out the defective piece of yarn from the body of the cloth and untwist the yarn to ascertain whether the undesirable matter is in the thread or only over the surface. For instance, in case of double roving if the strands come together and pluck a part of the clearer waste this can be detected when the yarn is unwound.

A book could be written on this last question. However, I will point out the chief causes of defective cloth. Dull licker-ins or the wire on same badly disarranged. The flat not set close enough. The doffer set too close to the cylinder. Dirty under steel rolls. Not picking the clearers often enough. Allowing brushing down while the machinery is in operation.

Wash (New York).

AN APPRECIATION.

EDITOR COTTON:

Under the heading of ,'The Question of Rules and Some Other Things," by "G. F. P.," you publish a very interesting letter, and I wish to go down in writing as saying that it was the most practical and explicit letter of its kind I ever had the pleasure of reading. I think "G. F. P." could find a berth in some textile school as an instructor of a new department on how help should be handled, and how to detect bad work and remedy the same, that is, if he has not held that position already. I know from experience that the hardest battle that an overseer has to fight is the handling of help and securing a fair day's work from them. How to accomplish this has to be learned by actual experience of many years duration. If the pupils had a man to teach them the art of handling help, a good, practical man, who could impress on their minds the importance of fitting themselves to take charge of a large number of operatives and the best way to do it, the result from an efficiency standpoint would make young overseers much more valuable men. I am a reader of several textile papers and take a great deal of interest in what I read from practical mill men. I like the articles and letters in COTTON very much and wait eagerly for it to come each month and hope to see in other issues further comments on the letter written by "G. F. P."

A Subscriber (Maryland).

"While affability, to some extent, is a talent, it is also, in some cases, genius—the one can be cultivated, but the other, if not natural, can be acquired only by great effort."

NEW MACHINERY AND TRADE NOTES.

TESTING YARN.

The strength of a bridge is only the strength of its weakest part. Likewise the weaving value of the yarn used in making cloth is limited by the number of threads that are below the standard in strength. When we consider the enormous investments in cotton mills and machinery equipment, planned by engineers selected for their recognized ability and experience, it is astonishing that so few of these mills have a system of accurate testing of yarns before weaving.

The weaving value of yarn is not measured by the average strength of a combined number of threads but by the regularity of the strength and the weaveability of the individual thread. A proper test must therefore recognize the quality of the separate threads.

It is seldom that we are obliged to look to our neighbors across the sea for improvements in textile machinery, but this time we must pay our English friends the compliment of being years in advance on the subject of testing yarns and the machine used for this purpose. As a starting point it is important to know just what quality of yarn is delivered to the weave room and this can only be shown accurately by a test of the individual yarns.

The Moscrop machine is driven by power, either motor or belt, as preferred, and taking six bobbins or cops of yarn at one time, seizes the ends, winds off a certain length and then breaks it through the pull of springs, the breaking strength being registered on a diagram paper. But a few minutes are consumed in the operation of making and recording the eighty breaks in each test. With the record at hand if the yarn is uneven and contains a large number of weak places, the trouble can be traced and a remedy provided.

Hundreds of these machines have been sold in Great Britain and on the continent.

The DRAPER CO. are the sole agents for the Moscrop yarn testing machine for the United States. They will be glad to test samples of yarn for their customers if desired. To make a satisfactory test they should have at least six bobbins of yarn of a given number. Samples should be between 15's and 90's.

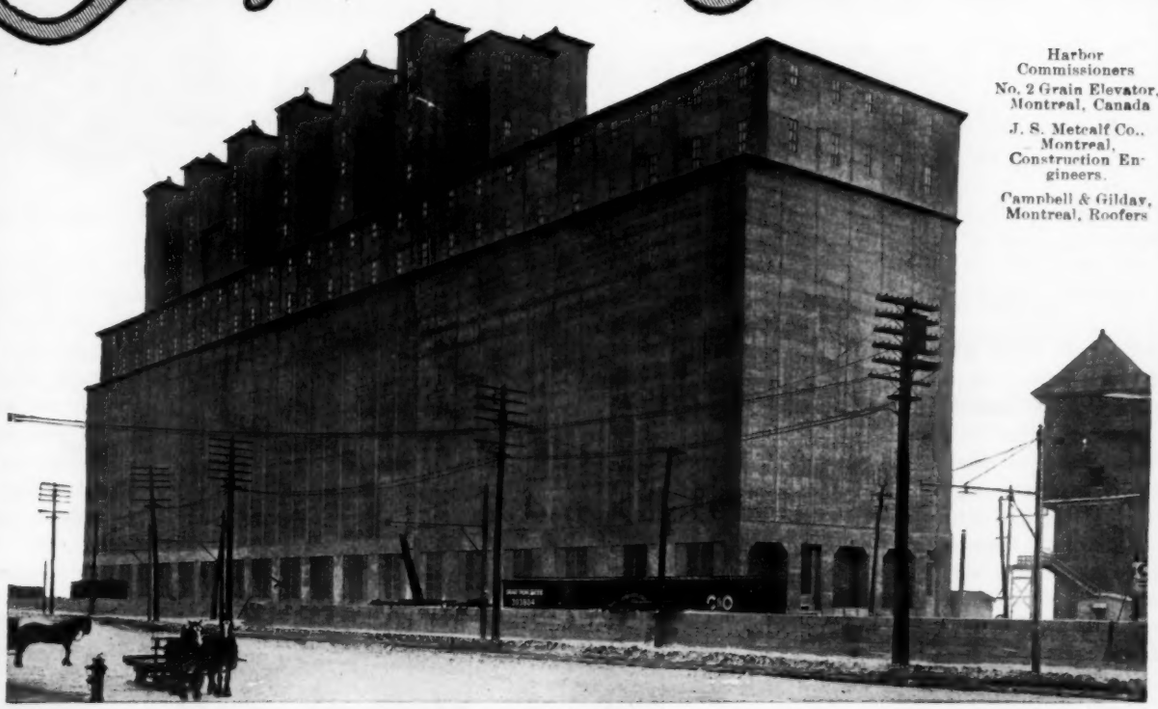
THE "FATHER" OF STEEL PULLEYS.

When we enter a power plant or factory and see on all sides of us steel pulleys, we are prone to forget that a comparatively short while ago there was no such thing as a pulley made of steel. For though it seems inconceivable, it is nevertheless true that men used belt pulleys for more than a century without once employing, in their manufacture, steel—a substance, which on account of its lightness, strength and durability is the logical pulley material. It remained for Thomas Corscaden to make pulleys exclusively of steel. About 1895 he exhibited a model of what shortly was to become famous as the "American" steel split pulley.

The "American" pulley was built on lines of correct construction, of sound mechanical principles, scientifically and yet simply applied. The smooth surface of the face, provided with a grooved air escape, produced a superior belt grip. The lightness of these pulleys saved power; their tight grip on the shaft obviated the cutting of keyways or the use of set screws. The "American," which was a split pulley was so easy to apply that it was welcomed by all who tried it. There was no need to spend hours in shaft stripping while possibly the whole plant was lying idle.

Today the American Pulley Company operates the largest pulley plant in the world—a lasting monument to the genius of Thomas Corscaden, the "father of steel pul-

Barrett Specification Roofs



Harbor Commissioners No. 2 Grain Elevator, Montreal, Canada

J. S. Metcalf Co., Montreal, Construction Engineers.

Campbell & Gilday, Montreal, Roofers

On the World's Largest Concrete Grain Elevator

As we have frequently pointed out, most of the large commercial buildings of the day are covered with a Barrett Specification type of roof.

For example, here is the great new grain elevator at Montreal. It is said to be the largest in the world, with a capacity of 2,600,000 bushels. It carries a Barrett Specification Roof 55,000 square feet in area.

The engineers chose this type of roof because it is the lowest-priced and most reliable roofing known.

Barrett Specification Roofs require no repairs or attention of any kind, they invariably last twenty years or more, and are fire-retardant.

Architects, engineers and owners of permanent buildings of all kinds should have a copy of the Barrett Specification on file.

A request will bring it by return mail.

Special Note

We advise incorporating in plans the full wording of The Barrett Specification, in order to avoid any misunderstanding.

If any abbreviated form is desired, however, the following is suggested.

ROOFING — Shall be a Barrett Specification Roof laid as directed in printed Specification, revised August 15th, 1911, using the materials specified and subject to the inspection requirement.

BARRETT MANUFACTURING COMPANY

New York Chicago Philadelphia Boston St. Louis Kansas City Cleveland Cincinnati Minneapolis Pittsburgh Seattle Birmingham, Ala.

THE PATERSON MFG. CO., Ltd.:—Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.

leys", and the man who established a standard of pulley efficiency, calling the product of his inventive skill "The American." More than two million of these pulleys are in use at the present time.

The American Pulley Company has moved its New York branch from 203 Lafayette Street into more commodious quarters at the corner of Grand and Greene streets. At the new address is carried a complete stock of "American" belt pulleys. Orders will be received for reels, spools, beams, sash pulleys and pressed steel shapes.

THE COWAN TRUCKING SYSTEM.

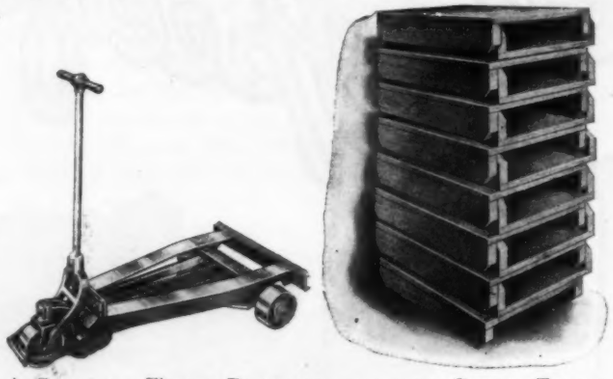
There is a great deal of activity among the manufacturers of all lines in an endeavor to bring their plants up to the highest standard of efficiency. There is no doubt but what many efficiency machines put on the market cost more to install than is warranted in the actual savings which they can effect, and this fact has prejudiced many managers against the word "Efficiency" to such an extent that they will not install any proposition connected with the word.

But it is generally conceded, on the other hand, that the manager who does not take steps forward and look into the new processes and methods of cutting down production costs will sooner or later find himself far in the rear of the procession.

Among the many labor and time saving machines which have been brought upon the market in recent years there stands out very prominently the Cowan trucking system, for the reason that this system has already been installed in the factories of over fifteen hundred progressive manufacturers in almost all lines of business. The methods by which trucking has been carried on within a factory have not been greatly improved for many years until the advent of the multiple platform system. Side by side with up-to-date and expensive machinery the manufacturers have been using obsolete and time worn systems of moving material, for the reason probably that factory trucking has always been considered in most plants as "one of those little things that is everybody's business" and consequently no one has ever taken the trouble to ascertain if the trucking within the factory was being done in the most economical way possible.

Today, however, the economies effected by the multiple platform system are a demonstrated fact—vast economies have been effected and proof in abundance has been gathered that the cost of the installation of the platform system will be paid for in net savings during the first three months it is in use. The Cowan trucking system is not only reasonable to install, costing about one-fifth of what the old-style four wheel trucks would cost, but it also does the work on an average of about 50 per cent of the old trucking costs. In operation the raw stock or goods in the process of finishing are placed upon inexpensive wooden platforms which have a clearance above the floor of 6 inches, and which cost about 75 cents each, and then when the goods are to be moved it is only necessary to slip the "Cowan Transveyor" under the platform, press down the handle which raises the wooden platform 1⅝ inches from the floor and locks it automatically in place—it is then ready to haul to any part of the mill, where, on reaching its destination to be unloaded, it is simply necessary to step upon a foot pedal and allow the handle to come slowly to a vertical position, releasing the heaviest loads without shock or jar.

There is saved each time this operation is performed the labor and time necessary to pile the raw stock or goods

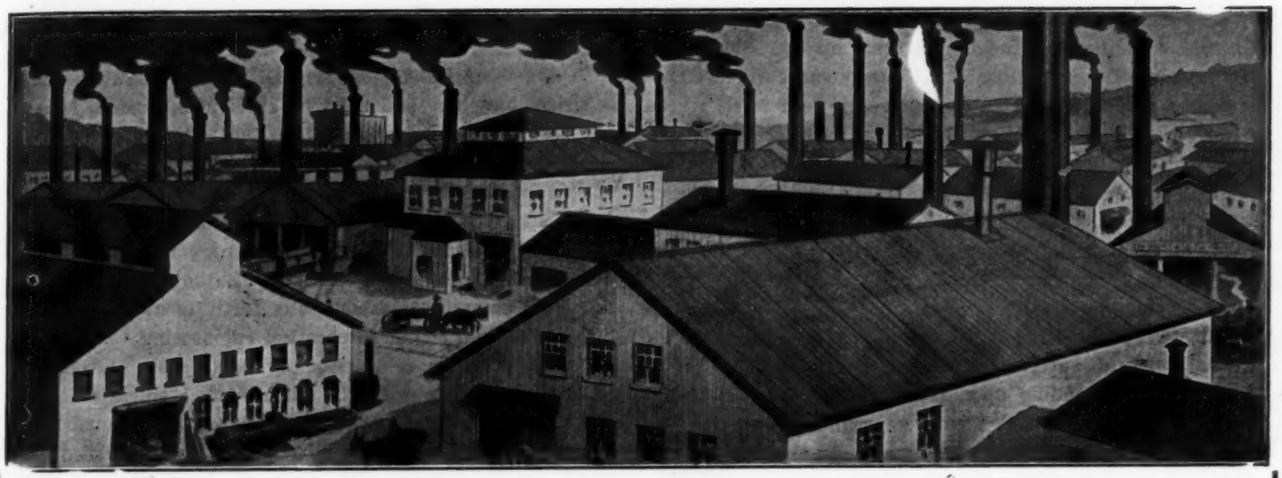


A STACK OF EMPTY PLATFORMS AND THE COWAN TRANSVEYOR.

in the process of finishing upon the four wheel platform trucks, and also the time and labor necessary to unpile the raw stock or goods in process of finishing from the platform truck upon the floor when the destination is reached. The actual time of hauling the goods would, of course, be about the same, but it is generally conceded that in the average mill four-fifths of the time consumed in trucking is spent in the loading and unloading—therefore by operating with the Cowan system and saving all the loading and unloading expense it is possible to save $1.60 on each $2.00 expended for trucking costs.

In the dyeing, drying, bleaching and finishing of cotton goods the "Cowan Transveyor" used in connection with multiple platforms has already been found by several concerns to effect a great saving. Further attention is called to the fact that at the dyeing machines and calenders the goods can be brought to one side of the machine on a platform and after being worked can be taken out of

THE COWAN TRUCKING SYSTEM IN THE PACIFIC MILLS.



THERE ARE OVER 300 IMITATIONS OF

RU-BER-OID
ROOFING

Some of these imitations look like RU-BER-OID but that is merely on the surface. The roofing buyer cannot see what is underneath, or he would not be fooled in buying goods on their appearance only.

As a house built on a poor foundation cannot last, neither can a roofing founded on poor material give the service expected of it.

Take None but the Genuine

RU-BER-OID

Accent on the "RU" and always spelled with one "B"

Unless the RU-BER-OID Man is shown on the outside wrapper, the roofing is not the genuine RU-BER-OID

KA-LOR-OID
(Colored Ruberoid)
ROOFING

RED---BROWN---GREEN

The permanently colored prepared roofing

The ideal roofing for Bungalows, Cottages—in fact suitable for any building where artistic effect is desired.

The Standard Paint Company,

100 Williams Street, NEW YORK

BOSTON. CHICAGO. DENVER.

the machine onto an empty platform. The saving involved here is that the manufacturer is tying up two inexpensive wooden platforms worth about 75 cents each, where otherwise he would be tying up two expensive four wheel trucks which would cost at least $10.00 each. Of course, if the trucks were not placed on each side of the machine it would be necessary to pile and unpile and if this latter method is used the economy effected by the Cowan system is even greater than in the first case—but looked at from any angle this new system of mill trucking can effect a vast saving.

There should be equal opportunities in mills at the cards, pickers, spoolers and looms, in the application of the system depending upon the layout of the mill and it has been found that each factory superintendent or manager can adopt the size of transveyor and the size of platform best suited to his plant. The Cowan Truck Company make the transveyor in three different styles and six different sizes. The transveyors are built to fit the requirements; it is not necessary to change the mill to fit the system.

In addition to the economies effected in the actual process of manufacture and finishing there are equally large economies to be effected in the storage room; floor space is valuable in any plant and with the Cowan trucking system floor space can be increased on an average of about 30 per cent. This is possible because of the ability to "get in behind" meaning by this that in the store room goods can be piled four rows deep, then an aisle, four more rows and then another aisle and so on across the room. To get at the goods in the middle pile it is only necessary to slip the Cowan Transveyor under the outside pile, pull it out into the aisle and go back and get the goods which are wanted in the second row. This consumes but a few moments and the saving in floor space offsets many times the amount of time consumed.

The Cowan Company appreciate that systems do not grow like garden plants—they have to be worked out, and with this idea in mind they have twenty-one expert men who are pleased to go into any mill and look over the working conditions, and after giving the same due study make a report advising the best system of transportation to install. This much costs the manufacturer nothing, as the COWAN TRUCK COMPANY are pleased to install their machine on trial so confident are they of the successful operation of the system. The main office and factory is located at Holyoke, Mass.

IN THE GOOD OLD SUMMER TIME.

Whew! Some hot! A nice little electric fan on the corner of your desk will give you a fine ocean breeze while you work. The FIDELITY ELECTRIC CO., of Lancaster, Pa., make them in all styles and will ship an 8-inch fan by parcel post if you wish. Special prices for the balance of the season. Mention COTTON.

The NEW YORK REVOLVING PORTABLE ELEVATOR CO., 344-352 Garfield Ave., Jersey City, N. J., are sending out a unique mailing card containing a movable demonstrating device to illustrate the convenience of the Revolvator for warehouse purposes. Send them a postal, mentioning COTTON, and ask for Bulletin 23.

RETIREMENT OF D. J. DANKER.

The firm of Danker & Marston, the well-known dealers in sizing, bleaching and finishing specialties, Boston, Mass., has been dissolved by mutual consent, Daniel J. Danker retiring and the business being conducted under the name of and by John P. Marston.

This step is one that Mr. Danker has had under consideration for some time. He will enjoy the summer vacation at his cottage at West Chop, Martha's Vineyard, and later will enter the Massachusetts Institute of Technology, taking a special course in chemical engineering.

Messrs. Danker & Marston terminate their partnership of over ten years with the same cordial spirit that has marked their business relations, and their large number of customers can feel assured that their interests will be as carefully conserved in the future as they have been heretofore. Mr. Marston has a capable corps of assitants, but will give the same careful personal attention to the needs of his trade that he and his partner have always given in the past. Mr. Danker's retirement involves no other change in the business, the same specialties and accounts being handled by Mr. Marston as were formerly controlled by Danker & Marston.

Joseph H. Shinn, Jr., for the past ten years the head of the cotton carding, spinning, knitting and silk manufacturing departments of the Philadelphia Textile School, has severed his connection with that institution to become manager of the Notaseme Hosiery Co., of Philadelphia. During his ten years of service at the school, the three branches under his charge advanced considerably, especially the silk and knitting departments. The many friends of Mr. Shinn, both in and out of the trade, will wish for him the same great success in the future that he has attained in the past.

Graduates of the Textile Department at the A. & M. College, West Raleigh, N. C., have been appointed to the following positions during the past year. W. S. Dean, assistant cotton technologist, Department of Agriculture, Washington, D. C. L. R. Gilbert, superintendent, Caraleigh Cotton Mills, Raleigh, N. C. J. S. Stroud, superintendent, Lauderdale Mills, Meridian, Miss. G. G. Simpson, assistant secretary, Great Falls Mfg. Co., Rockingham, N. C. W. M. Millner, assistant superintendent, Holt-Granite Mills, Haw River, N. C. M. Hendrick, overseer spinning, Cliffside Mills, Cliffside, N. C. G. G. Allen, overseer carding, Gibsin Mfg. Co., Concord, N. C. J. C. Cosby, designer, Brogon Mills, Anderson, S. C. C. J. Hall, cost accountant, New York Mills, New York.

THE BAYER COMPANY, INC., 117 Hudson street, New York, are sending to the trade the following color cards: Katigen Indigo C L 5 G extra conc.; katigen black brown G N extra conc.; katigen deep blue B H extra conc.; diazo brilliant scarlet R G; gallo fast green S K powder; and chrome fast yellow R. D. powder.

Florida is the leading state of the Union in the production of phoshate rock, according to the United States Geological Survey. In 1911 the phosphate product was valued at $9,473,638, compared with $8,647,774 in 1910.

BOOK REVIEWS

All Books Reviewed Under This Heading May Be Procured From COTTON at the Published Price.

THE BLUE BOOK TEXTILE DIRECTORY, 26th annual edition, published by the DAVISON PUBLISHING CO., 407 Broadway, New York. Price delivered: Office Edition $4.00; Pocket Edition, $3.00; Salesmen's Edition, $3.00.

This twenty-sixth edition, just issued, shows some 479 new mills and firms added to the work this year, of which a separate list is given.

The office edition contains over 1050 pages, and the pocket edition a trifle less, the office edition being printed on coated paper with a large page, while the pocket edition is printed on very light paper with smaller pages and flexible covers, to make the volume as light as possible for those wishing to use it on the road.

The Salesmen's edition contains 384 pages, size 3¾ by 5½, this volume being issued specially for the traveler visiting the textile mills, weighs only five ounces.

The textile maps have been revised to date, these showing all towns at which textile mills, dye, print or bleach works are located.

The Blue Book contains accurate, full and revised reports of all Textile Manufacturers in the United States and Canada, including in the office edition a Classified Directory of the Cotton and Woolen Mills and a Directory of Textile Mill Supplies, covering the Machinery, Chemical and Dye-Stuff Manufacturers, with Commission Merchants, Yarn Dealers, Cotton, Wool, Waste and Hair Dealers, etc., and these with thumb indexes for quick reference and its many pages of specially engraved maps, make it a trade work of the highest order.

A ranch man, W. E. Green, of Tulare, Calif., has a Crocker-Wheeler, Form Q, induction motor, which he purchased to use in driving a pump for irrigation purposes.

One night the power went off and the no voltage release disconnected the motor, stopping the action of the pump. The water during the night backed up from the irrigation ditch into the pit where the motor and pump were installed until the set was submerged in four feet of water.

In the morning the ranch man, who had not noticed that the motor was flooded, turned on the current and started the set, which ran from ten to fifteen minutes under water. When he discovered to his surprise that the motor was submerged the machine was taken out, dried in an oven and immediately put into service again. It has been continuously running without repair or extra attention ever since.

BERLIN ANILINE WORKS, 215 Water street, New York City, are sending to the trade color cards describing their milling yellow 3 G; milling orange G; and cloth red G L and G F L. Copies of these cards may be secured on application.

Did you ever see a copy of the *Cord Age*? It's a little magazine devoted to more rope. Your name on a postal addressed to Cord Age, Cor. Noble and West streets, Brooklyn, N. Y., will grant you this pleasure, and it's worth the trouble.

Roof Fires Must Stop!
SAFETY ENGINEERING reports five recent fires, aggregating a loss of $150,000, due to sparks on wood-shingle roofs! Each one of these fires could have been prevented with
CORTRIGHT METAL SHINGLES
"The Permanent Roofing"
These shingles are made in four styles and are adaptable to operatives' cottages as well as more elaborate dwellings. Fireproof, stormproof, wearproof.
Cortright Metal Shingles last as long as the building and never need repairs.
Take a minute right now to send a postcard for our free book, "Concerning That Roof."
Cortright Metal Roofing Co.
Philadelphia Chicago

How do you handle the rolls of cloth at your calenders and yarding machines? On a home made truck! Did you ever see a strongly built, well proportioned truck designed especially for this work? Such a truck is shown in many varieties by THE GEORGE P. CLARK CO., Windsor Locks, Conn., in their new Bulletin K. Also stock trucks, dumping trucks, platform trucks and numerous other kinds for various uses. Send for a copy. It's free, only mention COTTON.

Back in 1900 the JOSEPH DIXON CRUCIBLE CO., of Jersey City, N. J., installed an electric plant for generating power and light for the pencil department. After having more or less trouble with the carbon brushes they decided to experiment a little in the brush making line and the result is known as Dixon's graphite brushes. They have recently issued a little booklet on these brushes that will be sent for the asking. A postal will do.

CASSELLA COLOR COMPANY, 182 Front street, New York City, are sending to the trade color cards describing diamine aldehyde black F G and F B conc., and diamine fast black G V extra conc.

THE EUREKA FIRE HOSE MFG. CO., with main offices in New York City, has appointed W. S. Harley to be their agent in the states of Montana, Oregon, Idaho and Washington, with offices in the Paulsen Building, Spokane, Washington, for the Fire Department Hose manufactured by them.

VALUABLE VACATION INFORMATION.

Vacation time usually suggests to the readers of this journal thoughts of New England, and the "hub" of New England is Boston, where any trip to any point in that vast recreation country always starts. There arises the question, "What hotel shall I stop at when passing through Boston?"

The Comonwealth Hotel, on Beacon Hill, answers this question in a thorough and delightful way. It is situated on one of the highest points in the capital of the old "Bay State;" in fact, one can actually see Boston Light, nine miles distant from its upper floors. It is, therefore, always cool and comfortable, away from the noise of the city, and yet within easy walking distance of every point of interest. It is a delightful place for ladies to stop, unaccompanied by gentlemen, being a temperance hotel and under the management of Storer F. Crafts, one of the country's best known and most successful hotel managers.

It might be added that it is located opposite Boston's historic and beautiful State House. Rates are reasonable, running from $1.00 per day up. Write for a handsomely illustrated booklet.

In preparing their soluble softening oil THE ARABOL MFG. Co., 100 William St., New York City, have succeeded in manufacturing a compound of absolute uniformity all the year round. It will stand heat and will not sour in the hottest season. Those who use it prefer it to tallow and other oils and greases because it is more efficient and easier to handle. Being neutral it is most suitable for close-woven and strong goods. It gives a smooth finish to the warps while the threads divide well in the lease rods and the cylinder of the slasher remains perfectly clean.

MILL NEWS

Notices of mill projects, additions or improvements are solicited for this department

ARKANSAS.

HELENA. The plant for the St. Francis Cotton Mills is nearing completion and it will soon be in operation. This company is to manufacture osnaburgs and sheetings.

CALIFORNIA.

SAN BERNARDINO. Plans are being made for the erection of a cotton mill just south of this city. The site is 350 by 1,320 feet, close to the Pacific Electric line and but a short distance from the Southern Pacific. The mill will be patterned after a large mill in Atlanta, and will have five buildings: a main building 118 by 525 feet; bleaching room, 75 by 280 feet; dyeing room, 90 by 40 feet. California, Arizona and Texas cotton will be used for operating the mill.

GEORGIA.

ATLANTA. The Fulton Bag & Cotton Mills are to install equipment and electric drives which is to include a transformer and eight motors ranging from 5 horse power to 150 horse power.

SARGENT. The Wahoo Mfg. Co. has placed a contact with the Mason Machine Works for 3 cards, 1 drawing frame, spinning frames and 1 spooler.

HARTWELL. The Hartwell Mills, it is reported, expect to double the capacity of their plant, although no definite time for effecting this enlargement has been set.

WEST POINT. The Lang Mfg. Co. has been reorganized as the Lang Cotton Mills. A. C. Smith is president of the new company, and Joe Herzfeld is secretary and treasurer.

LAGRANGE. The Dixie Cotton Mills are proceeding with their previously announced plan for the enlarging and resuming the manufacture of cotton cloth. This plan provides for an erection of an addition 190 feet by 100 feet and the installation of new machinery. Park A. Dallis, of Atlanta, Ga., is the architect in charge.

VALDOSTA. The first meeting of the creditors of the Atlantic & Gulf Mills was held at Valdosta before the referee in bankruptcy recently. A trustee was appointed to sell the property to pay off the debts. It is said the trouble in this mill was due to a lack of cooperation among the officers and owners of the mill. The mill was placed in the hands of the receiver last May.

SOCIAL CIRCLE. The sale of the Social Circle Cotton Mill, which was advertised to take place July 1st, has been postponed because no one qualified to bid by putting up the necessary deposit demanded. It will probably again be put upon the market in three or four months.

MARYLAND.

CUMBERLAND. The Merchants and Manufacturers' Association plan securing a large knitting mill for this place which manufacturers propose to establish in Maryland.

MISSISSIPPI.

COLUMBUS. The Tombigbee Cotton Mills will add 60 automatic looms and make improvements.

MISSOURI.

ST. LOUIS. The Amazon Rubber Co. have almost completed their three-story building and will expend $60,000 to $75,000 for building and machinery for the manufacture of rubberized cloth for waterproof clothing. The company was recently incorporated with a capital stock of $100,000.

NORTH CAROLINA.

BREWERSVILLE. The Brewersville Cotton Mills Co. is painting the 150 houses occupied by the operatives and expects to equip them with electric lights.

DURHAM. William J. Berry has organized a new hosiery mill here. The plant is at Pettigrew street and Alston Avenue, and the product is 176 needle half hose to be sold in the gray. Mr. Berry has purchased in an initial equipment of 20 knitting machines, 3 loopers and 4 ribbers.

LAWNDALE. The Cleveland Mill & Power Co. has plans and specifications for a further addition to its facilities, to which it recently completed an addition for twisting and ball winding. This company's latest enlargement will be equipped for dyeing. The new building will be two stories high and of brick construction, 185 feet long by 75 feet wide. The product of this company comprises carpet warps, twines, wicks and other similar cotton goods.

DURHAM. The Durham Cotton Mfg. Co. are adding 1400 spindles.

LEXINGTON. The Erlanger Cotton Mill is rapidly taking on the form of a cotton manufacturing establishment. There has been a big force grading the street out to the Salem road. Another force is digging for the reservoir. Still another has been at work on the warehouses and then there is the large number that is engaged in building the mill proper.

TAYLORSVILLE. The Watts Manufacturing Company intends to purchase and install 6,000 additional new spindles in order to provide for a large daily increase in its production of cotton yarns. It will invest approximately $150,000 for the new equipment and has already awarded contract for 2,000 spindles. Another 2,0000 spindles have been ordered on a conditional contract and the remaining 2,000 will later be arranged for. In connection with these installations the company will also add some cone winders..

OKLAHOMA.

SAND SPRINGS. The local commercial club are negotiating with manufacturers relative to the establishment of a cotton factory at this place. It is expected that these negotiations will prove successful.

SOUTH CAROLINA.

TROUGH. The Pacolet Mills have recently completed the installation of nearly 7,000 additional spindles.

TENNESSEE.

MEMPHIS. The Memphis Cotton Mfg. Co. expect to have reinforced concrete buildings constructed of a size sufficient for machinery to bleach and prepare absorbent cotton. The daily capacity of this plant is expected to be about 2,000 lbs. and it will probably cost in the neighborhood of $75,000.

TEXAS.

DALLAS. The Dallas Waste and Bagging Mills, recently reported as incorporated with a capital stock of $300,000, have organized with the following officers. M. H. Thomas, president; C. H. Thomas, vice president; F. D. Thomas, secretary and treasurer. They have purchased buildings for their plant and will install machinery for a daily output of one carload of bagging.

WISCONSIN.

BEAVER DAM. The Paramount Metal Form Drying Co., located at Beaver Dam, Wis., have increased their capital stock from $10,000.00 to $20,000.00, and secured much larger space for the rapidly increasing business of their metal drying forms for hosiery

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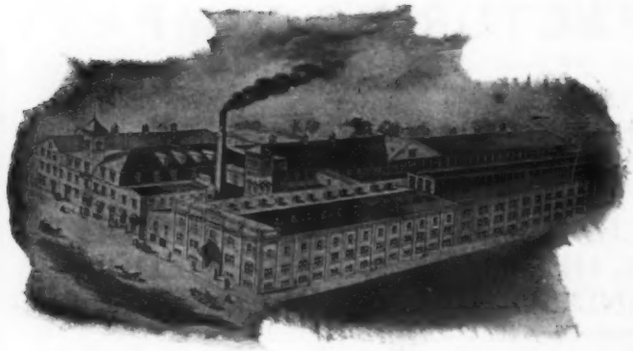

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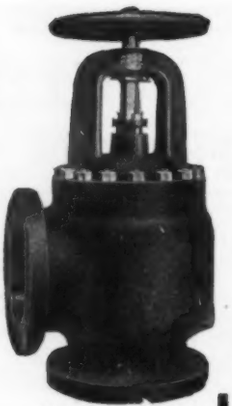

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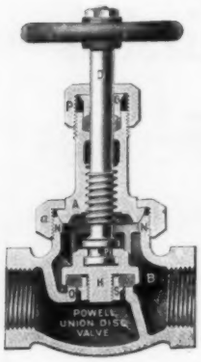

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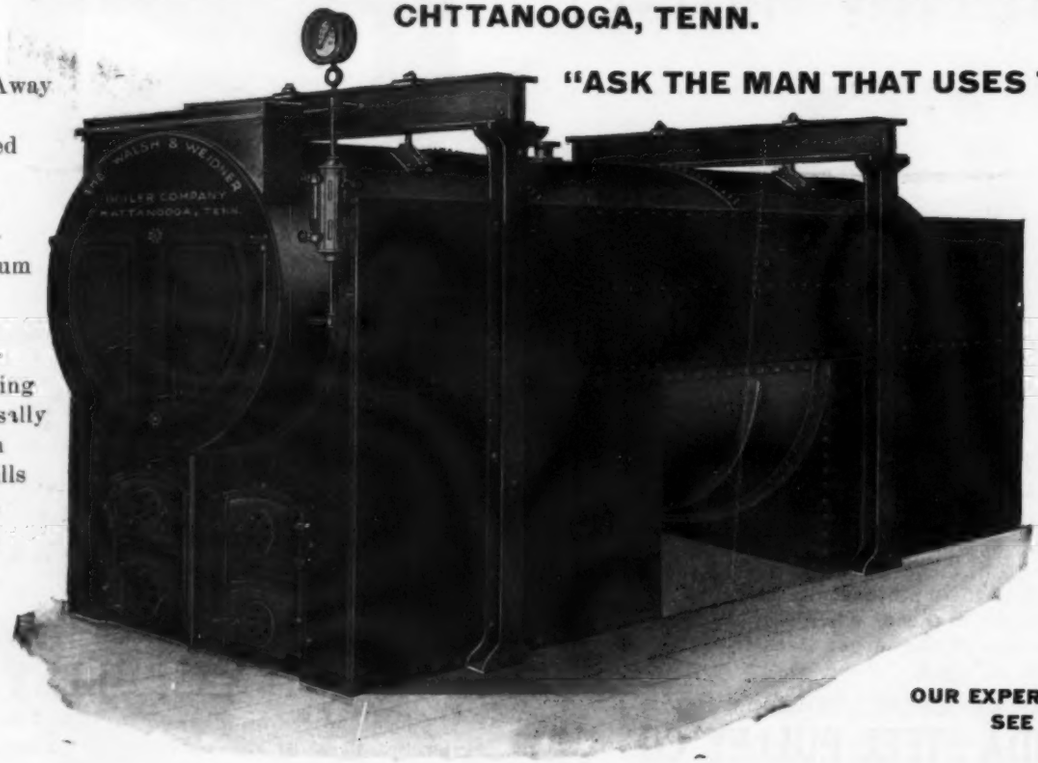

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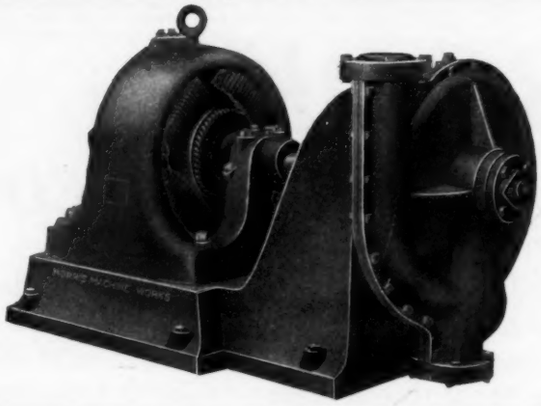

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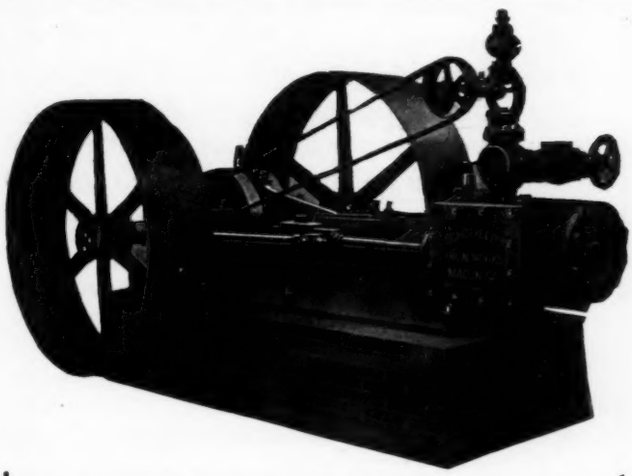

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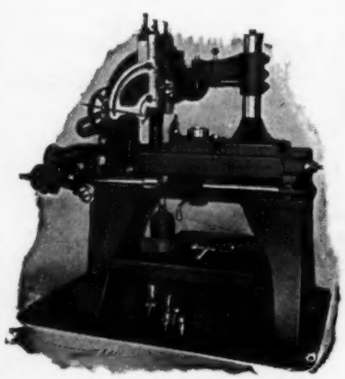

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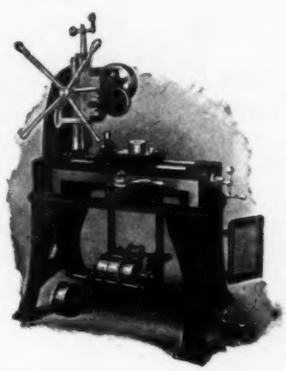

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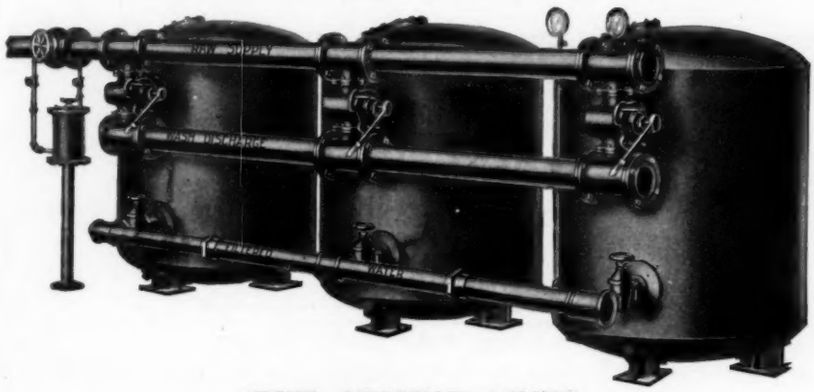

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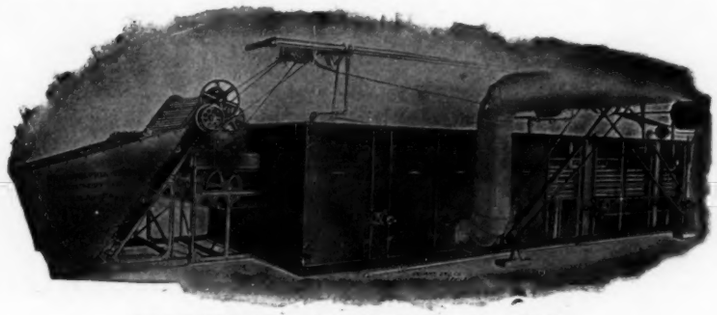
PROCTOR DRYING MACHINES FIREPROOF

The Proctor Dryers are built entirely of metal with all bearings outside away from the heat, two features which make the Machines not only absolutely fire proof but also very substantial and durable.



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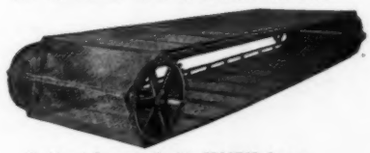

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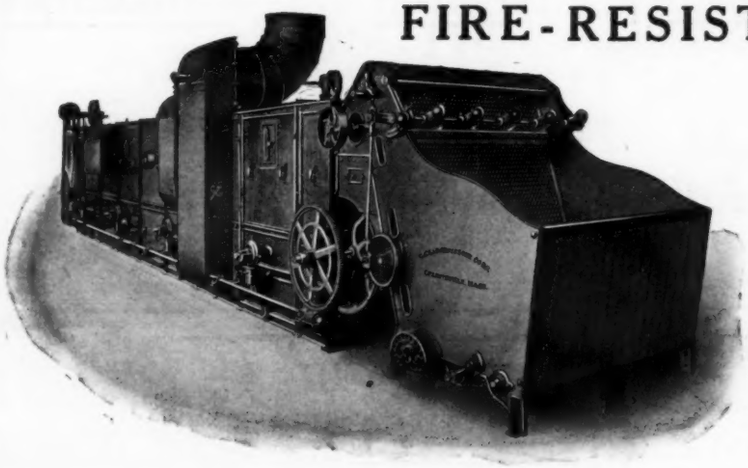

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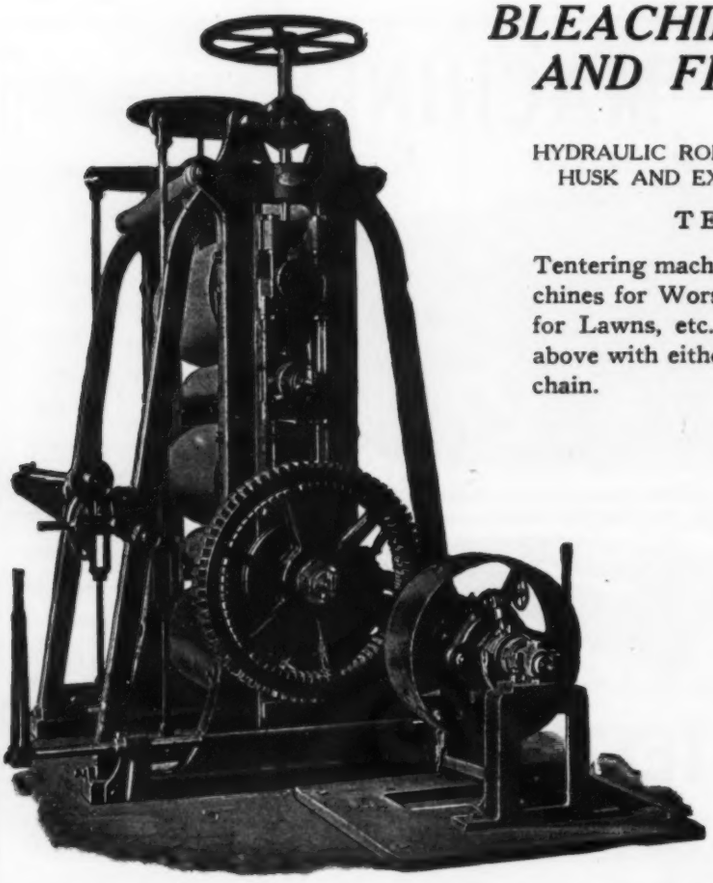

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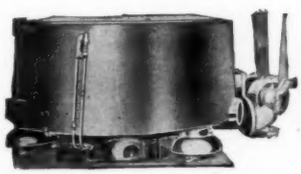

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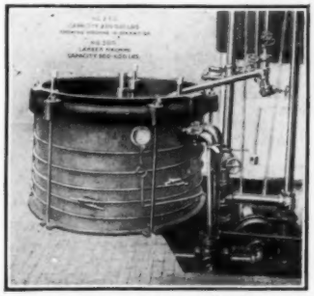

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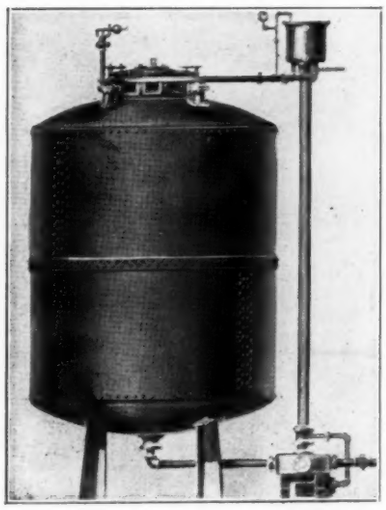

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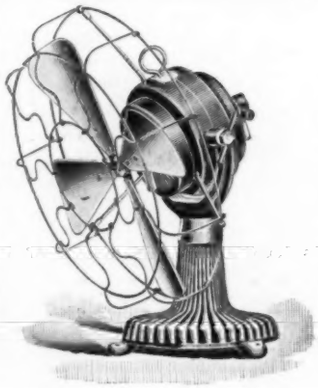

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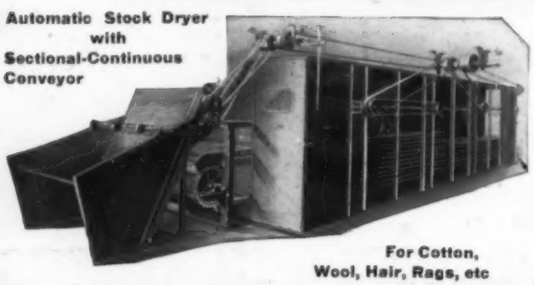

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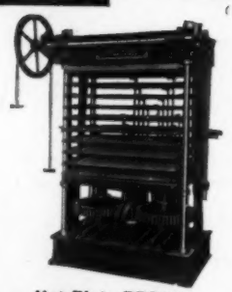

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